Fact Sheet

Public Comment Start Date: April 4, 2014
Public Comment Expiration Date: May 5, 2014

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Proposed Issuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)

Avimor Water Reclamation Company
Avimor Water Reclamation Facility

EPA Proposes To Issue NPDES Permit

EPA proposes to issue an NPDES permit to the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

401 Certification

EPA is requesting that the Idaho Department of Environmental Quality certify the NPDES permit for this facility, under section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Regional Administrator
Idaho Department of Environmental Quality
1445 North Orchard
Boise, ID 83706

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review
The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://epa.gov/r10earth/waterpermits.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900, OW-130
Seattle, Washington 98101-3140
(206) 553-6251 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

EPA Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

Idaho Department of Environmental Quality
Boise Regional Office
1445 North Orchard
Boise, ID 83706
(208) 373-0287

Table of Contents

Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of once every three years, for a 30-day average flow rate.
AML	Average Monthly Limit
BOD_5	Biochemical oxygen demand, five-day
EC	Degrees Celsius
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	Milliliters
ML	Minimum Level
:g/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan

RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. Applicant

Facility

Facility Name:	Avimor Water Reclamation Facility (AWRF)
Mailing Address:	18454 North Mcleod Way Boise, ID 83714
Physical Location:	Approximately 10 miles north of Eagle, ID, east of State Highway 55 in Ada County, Idaho. At the boundary of Sections 18 and 19, T5N, and R2E
Contact:	Brad R. Pfannmuller Land Development Manager, Avimor, LLC

Applicant

Applicant Name:	Avimor Water Reclamation Company
Mailing Address:	18454 North Mcleod Way Boise, ID 83714
Contact:	Brad R. Pfannmuller Land Development Manager, Avimor, LLC

Operator

Operator:	OMCS
Mailing Address:	9245 W. Bay Stream Ct. Boise, Idaho 83714

II. Facility Information

Avimor Partners is currently constructing a new residential development north of Eagle, Idaho known as the Avimor Planned Community. The Avimor Water Reclamation Facility (AWRF) has been constructed to provide wastewater treatment for the new development. The projected population served by the treatment facility is 8,000. The treatment process consists of:

- Primary treatment consisting of 3 mm circular drum fine screening followed by flow equalization.
- Secondary/tertiary treatment using an activated sludge membrane bioreactor process with biological nutrient removal.
- Disinfection using chlorine.

The Avimor Water Reclamation Company (AWRC) owns and is responsible for the treatment facility and the entire municipal wastewater reuse system. A contractor, OMCS, is responsible for the complete treatment and operations. OMCS, under an annually renewable contract, is responsible for all testing of the treated wastewater and the wastewater reuse permit issued by EPA and IDEQ.

The maximum monthly design flow of the planned facility will be 0.42 million gallons per day (mgd).

This permit authorizes the discharge of effluent from the AWRF to Spring Valley Creek October 1st – March 31st. Under a separate water reuse permit issued by the Idaho Department of Environmental Quality (IDEQ)[1], the effluent will be discharged to an irrigation system during the growing season April 1st - September 30th.

Discharge to Spring Valley Creek is prohibited April 1st - September 30th.

Details about the wastewater treatment processes and waste streams are included in Appendix A. See Appendix B a map of the location of the proposed discharge location. This will be the facility's first NPDES permit.

III. Receiving Water

The AWRF will discharge to Spring Valley Creek, a tributary to Dry Creek, which is a tributary to the Boise River.

The discharge to the receiving water will consist of a single pipe outfall to Spring Valley Creek adjacent to the treatment facility. Outside of this area, the effluent discharge is regulated under the facility's State wastewater reuse permit.

A. Low Flow Conditions

The *Technical Support Document for Water Quality-Based Toxics Control* (hereafter referred to as the TSD) (EPA, 1991) and the Idaho Water Quality Standards (WQS) recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the Idaho WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria. However, because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA has used the 30B3 for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based design flow intended to ensure an excursion frequency of less than once every three years for a 30-day average flow rate.

EPA used daily flow data from USGS station #13207000 (Spring Valley Creek near Eagle, ID) to calculate the critical low flows of Spring Valley Creek. All low flows (1Q10, 7Q10, and 30B3) were 0 cfs for this location during the period of discharge from October 1 through March 31.

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[1] http://www.deq.state.id.us/permitting/issued-permits.aspx?page=5&records=10&type=all&sort=nameAscending

B. Water Quality Standards

Section 301(b)(1)(C) of the Clean Water Act (Act) requires that NPDES permits contain effluent limits necessary to meet water quality standards. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water biota, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

The receiving waters to which the AWRF will discharge are undesignated. The Idaho Water Quality Standards state that waterbodies that are not designated are to be protected for cold water aquatic life and primary or secondary contact recreation beneficial uses unless Sections 101.01.b and 101.01.c. are followed. In addition, the Idaho Water Quality Standards state that all waters of the State of Idaho are protected for industrial and agricultural water supply (Section 100.03.b and c.), wildlife habitats (100.04), and aesthetics (100.05).

Because of the potential for human contact, effluent limits were also developed for protection of primary contact recreation.

C. Water Quality Limited Waters

A water quality limited segment is any waterbody, or definable portion of a waterbody, where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards. In accordance with section 303(d) of the Act, States must identify waters not achieving water quality standards in spite of the application of technology-based controls in National Pollutant Discharge Elimination System (NPDES) permits for point sources. Such waterbodies are known as water quality limited segments (WQLSs), and the list of such waterbodies is called the "303(d) list." Once a waterbody is identified as a WQLS, the States are required under the Act to develop a total maximum daily load (TMDL). A TMDL is a determination of the amount of a pollutant from point, nonpoint, and natural background sources (including a margin of safety) that may be discharged to a waterbody without causing the waterbody to exceed the water quality criterion for that pollutant.

According to IDEQ's Final 2010 305(b) Integrated Report, the proposed receiving water, Spring Valley Creek (Assessment Unit ID17050114SW013_03), is fully supporting the the beneficial use classification of the water body. However, the receiving water is a tributary to Dry Creek (not assessed), which is a tributary to a water quality limited segment of the Boise River. The Boise River is water quality limited for total phosphorus, sediment, temperature, and bacteria.

Sediment

In January of 2000, EPA approved the *Lower Boise River TMDL* (IDEQ, 1998, 1999), which included load (for nonpoint sources) and wasteload (for point sources) allocations for sediment and bacteria. Total suspended solids (TSS) was used as a surrogate for sediment wasteload allocations (WLA) for point sources.

In April 2008, the IDEQ finalized an addendum to the TMDL which included WLAs for the AWRF for TSS and bacteria (*2008 Addendum*)[2]. The *2008 Addendum* was approved by EPA in June of 2008. The wasteload allocations for TSS are a monthly average of 168 lb/day and a weekly average of 251 lb/day. These wasteload allocations are based on meeting technology based effluent limits for TSS (40 CFR 133.102(b)), assuming a projected design flow of 0.67 mgd. The TSS load allocated to the AWRF and to another point source discharger was subtracted from the 3.62-ton-per-day reserve capacity identified in the original *Lower Boise River TMDL,* leaving 3.098 ton-per-day of reserve capacity remaining for additional new dischargers or existing dischargers that may expand.

The mass effluent limits in the draft permit are more stringent than the wasteload allocations for AWRF from the *2008 Addendum*, since the limits in the draft permit are based on the current design flow of 0.42 mgd, not the project design flow of 0.67 mgd. The wasteload allocation in the TMDL will allow AWRF to expand to its projected design flow, if needed in the future.

The in-stream sediment concentrations that the *Lower Boise River TMDL* is intended to achieve are 50 mg/L as a 60-day average and 80 mg/L as a 14-day average. The TMDL analysis concluded that Idaho's narrative criteria for sediment would be attained if these concentrations and averaging periods were achieved in the Boise River. The technology-based concentration limits in the draft permit will limit the AWRF to significantly lower TSS concentrations than these (30 mg/L monthly average and 45 mg/L weekly average) at the end-of-pipe. Therefore, the TSS effluent limits in the draft permit are adequately stringent to ensure compliance with water quality standards for sediment in the Boise River, and are consistent with the wasteload allocation in the *Lower Boise River TMDL*, and *2008 Addendum*. See Appendix C for additional information about TSS effluent limits.

Bacteria

EPA has included effluent limitations for *E. Coli* in the permit for the AWRF. The *2008 Addendum* to the *Lower Boise River TMDL* established a concentration-based E. coli WLA for the AWRF of 126 CFU per 100 ml, based on a geometric mean of at least 5 samples collected within a 30-day period. The wasteload allocation is identical to the State water quality standard. Therefore, the wasteload allocation requires that the AWRF comply with the state water quality standard for bacteria at the end-of-pipe.

Temperature

Because this discharge is to a tributary of the Boise River, it is unlikely that it will have a measurable impact on the temperature of the Boise River. The permittee is required to monitor effluent and receiving water temperature. These data will be used to determine if a water quality-based temperature effluent limit may be necessary in the future.

[2] http://www.epa.gov/waters/tmdldocs/L%20Boise%20Sed%20Bact%20TMDL%20addendum.pdf

Phosphorus

Although Spring Valley Creek and Dry Creek are not listed in the 2002/2004 303(d)/305(b) integrated report as being impaired for nutrients, both are tributaries to the Lower Boise River. The *Snake River Hells Canyon TMDL* has established a load allocation for phosphorus to the Boise River which applies seasonally from May 1st through September 30th.

The elevated phosphorus concentration in the Boise River is contributing to the impairment of the Snake River, and the *Snake River Hells Canyon TMDL* (Idaho DEQ and Oregon DEQ 2003, 2004) calls for a reduction in phosphorous loading to the Snake River from the Boise River and other tributaries during the critical season (May 1st through September 30th). The *Snake River Hells Canyon TMDL* requires the Boise River to achieve a load allocation of less than or equal to 70 µg/L. The EPA has used this 70 µg/L load allocation to interpret Idaho's narrative criterion for nutrients. The narrative criterion for nutrients, which is in Section IDAPA 58.01.02.200.06 of the Idaho WQS, reads as follows: "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses." The 70 µg/L interpretation of the narrative criterion applies to the Boise River at the mouth during the May 1st to September 30th season.

Because the AWRF does not discharge in the season during which the *Snake River Hells Canyon TMDL* applies, phosphorus limits are not included in the permit. The permittee is required to monitor the effluent discharge for phosphorus. At this stage, it is not possible to evaluate the need for winter phosphorus limits for the AWRF. The EPA recognizes that winter discharges of phosphorus may, under certain conditions, impact downstream reservoirs. The IDEQ intends to submit to the EPA a draft nutrient TMDL for the Lower Boise by spring 2014. The IDEQ plans to collect data to enable them to evaluate the nutrient loading to the river during multiple seasons, including winter and summer. The EPA expects the TMDL to evaluate the need for year-round nutrient limits and to establish wasteload allocations for point sources and load allocations for non-point sources to meet water quality standards. The EPA intends to incorporate the assumptions and requirements of any approved wasteload allocations in the next permit for this facility.

IV. Effluent Limitations

A. Basis for Effluent Limitations

In general, the Act requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards of a waterbody are being met and may be more stringent than technology-based effluent limits. The bases for the proposed effluent limits in the draft permit are provided in Appendix C, D, and E.

B. Proposed Effluent Limitations

Below are the proposed effluent limits that are in the draft permit.

1. 85% Removal Requirements for BOD_5 and TSS: The monthly average effluent concentration must not exceed 15 percent of the monthly average influent concentration. Percent removal of BOD_5 must be reported on the Discharge Monitoring Reports (DMRs). For each parameter, the monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month. Influent and effluent samples must be taken over approximately the same time period.
2. The permittee must not discharge floating, suspended or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses.
3. The pH must not be less than 6.5 standard units (s.u.) nor greater than 9.0 standard units (s.u.).
4. Table 1 (below) presents the proposed average monthly, average weekly, maximum daily, and instantaneous maximum effluent limits.
5. This permit authorizes the discharge of effluent from the AWRF to Spring Valley Creek October 1st – March 31st. Discharge to Spring Valley Creek is prohibited April 1st - September 30th.

Table 1: Effluent Limits in Draft Permit

Parameter	Units	Effluent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Five-Day Biochemical Oxygen Demand	mg/L	30	45	—
	lb/day	105	158	—
Total Suspended Solids	mg/L	30	45	—
	lb/day	105	158	—
***E. Coli* Bacteria**	#/100 ml	126[1]	—	406[2]
Total Residual Chlorine	µg/L	9	—	18
	lb/day	0.03	—	0.06
Total Ammonia as N	mg/L	2.4	—	4.7
	lb/day	8	—	17

Notes:
1. Geometric mean.
2. No single sample may exceed 406 organisms per 100 ml (instantaneous maximum limit).

C. Schedules of Compliance

The Federal regulation 40 CFR 122.47(a)(2) prohibits schedules of compliance for new dischargers in most cases. The only exception is when new requirements are issued after commencement of construction but less than three years before commencement of the relevant discharge. Because the AWRF is a new discharger, no compliance schedule may be authorized. The permittee must comply with all effluent limitations starting on the effective date of the final permit.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the Act and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA).

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Minimum Levels (MLs) are less than the effluent limits.

The purpose of the recommended monitoring requirements is to ensure that the permittee is collecting adequate data to assess compliance with the temperature water quality standards. The data may also be for development of WLAs in the TMDL and ESA consultation.

Table 2, below, presents the effluent monitoring requirements for the AWRF in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water.

If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Monitoring for alkalinity, hardness, oil and grease, total dissolved solids, total Kjeldahl nitrogen, and nitrate plus nitrite nitrogen is required because all POTWs with a design flow greater than 100,000 gallons per day are required to submit these data with their application for renewal of their NPDES permit.

Temperature data must be recorded using a micro-recording temperature device known as a thermistor. For effluent temperature monitoring, set the recording device to record at one-hour intervals. Report the following temperature monitoring data on the DMR: monthly instantaneous maximum, maximum daily average, seven-day running average of the daily instantaneous maximum. Use the temperature device manufacturer's software to generate (export) an Excel text or electronic ASCII text file. The file must be submitted annually to IDEQ by January 31 for the previous monitoring year along with the placement log. The placement logs should include the following information for both thermistor deployment and retrieval: date, time, temperature device manufacturer ID, location, depth, whether it measured air or water temperature, and any other details that may explain data anomalies.

Table 2: Effluent Monitoring Requirements

Parameter	Unit	Sample Location	Sample Frequency	Sample Type
Flow	Mgd	Effluent	Continuous	Recording
BOD_5	mg/L	Influent and Effluent	2/week	24-hour composite
	lb/day			calculation[1]
	% Removal	% Removal	1/month	calculation[2]
TSS	mg/L	Influent and Effluent	2/week	24-hour composite
	lb/day			calculation[1]
	% Removal	% Removal	1/month	calculation[2]
***E. Coli* Bacteria**	#/100 ml	Effluent	5/month	grab
Total Residual Chlorine	mg/L	Effluent	5/week	grab
	lb/day			calculation
Total Ammonia as N	mg/L	Effluent	2/week	24-hour composite
	lb/day			calculation
	% Removal	% Removal	1/month	calculation[2]
Total Phosphorus as P	µg/L	Effluent	1/month	24-hour composite
	lb/day			calculation[1]
pH	standard units	Effluent	5/week	grab
Temperature[3]	ºC	Effluent	Continuous	meter
Alkalinity[4]	mg/L	Effluent	1/quarter	24-hour composite
Hardness[4]	mg/L as $CaCO_3$	Effluent	1/quarter	24-hour composite
Oil and Grease[4]	mg/L	Effluent	1/quarter	grab
Total Dissolved Solids[4]	mg/L	Effluent	1/quarter	24-hour composite
Total Kjeldahl Nitrogen[4]	mg/L	Effluent	1/quarter	24-hour composite
Nitrate plus Nitrite Nitrogen[4]	mg/L	Effluent	1/quarter	24-hour composite
Dissolved Oxygen	mg/L	Effluent	2/month	grab

Notes:
1. Maximum daily loading is calculated by multiplying the concentration in mg/L by the average daily flow in mgd and a conversion factor of 8.34.
2. Percent removal is calculated using the following equation:
   (average monthly influent - effluent) ÷ average monthly influent.
3. See temperature monitoring details above.
4. Quarters are defined as January through March, and October through December. Monitoring results for pollutants with a sample frequency of quarterly must be reported on the March and December DMRs.

C. Surface Water Monitoring

Table 3 presents the proposed surface water monitoring requirements for the draft permit. The permittee must conduct surface water monitoring once per month from October to March. Surface water monitoring results must be submitted with the application for renewal of this NPDES permit. Receiving water monitoring must be performed at least once during each calendar month. Surface water temperature values must be generated from a thermistor recording device with a minimum of forty-eight (48) evenly spaced measurements in a twenty-four (24) hour period.

Table 3: Surface Water Monitoring Requirements			
Parameter (units)	**Sample Locations**	**Sample Frequency**	**Sample Type**
Flow (CFS)	Upstream	monthly	Measure
Total Ammonia as N (mg/L)	Upstream	monthly	Grab
pH (s.u)	Upstream	monthly	Grab
Temperature (ºC)	Upstream	continuous	Meter
Phosphorus (mg/L)	Upstream	monthly	Grab

VI. Sludge (Biosolids) Requirements

EPA Region 10 separates wastewater and sludge permitting. Under the Act, EPA has the authority to issue separate sludge-only permits for the purposes of regulating biosolids. EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

VII. Other Permit Conditions

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Permittee is required to develop and implement a Quality Assurance Plan by the effective date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to EPA and IDEQ upon request.

B. Operation and Maintenance Plan

The permit requires the Permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The Permittee is required to develop and implement an operation and maintenance plan for the AWRF by the effective date of the final permit. The plan shall be retained on site and made available to EPA and IDEQ upon request.

C. Additional Permit Provisions

Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Restrictions on Permitting New Dischargers

The AWRF is a new discharger. The regulation 40 CFR 122.4(i) states that no NPDES permit may be issued to a new source or a new discharger if the discharge from its construction or operation will cause or contribute to the violation of water quality standards. EPA has determined that the proposed discharge has the reasonable potential to cause or contribute to violations of water quality standards for ammonia, chlorine, and pH. However, the draft permit proposes water quality-based effluent limits for all of these pollutants, which will ensure that the level of water quality to be achieved by these effluent limits is derived from and complies with applicable water quality standards. Therefore, this permit complies with 40 CFR 122.4(i).

B. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA has determined that the issuance of this NPDES permit will have no effect on threatened or endangered species, therefore, consultation is not required for this action. See appendix F of this fact sheet for more information.

C. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has determined that the discharge from the AWRF will not affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action.

D. State/Tribal Certification

Section 401 of the ACT requires EPA to seek State or Tribal certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

E. Permit Expiration

The permit will expire five years from the effective date.

IX. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

IDEQ. 1998, 1999. *Lower Boise River TMDL: Subbasin Assessment, Total Maximum Daily Loads.* December 18, 1998. Revised September 29, 1999. Idaho Department of Environmental Quality.

Appendix A: Facility Information

General Information

NPDES ID Number:	ID-0028371
Physical Location of Treatment Plant:	Approximately 10 miles north of Eagle, ID, east of State Highway 55 in Ada County, Idaho. At the boundary of Sections 18 and 19, T5N, and R2E
Physical Location of Discharge:	Spring Valley Creek
Mailing Address:	18454 North Mcleod Way Boise, ID 83714

Facility Information

Type of Facility:	Privately Owned
Treatment Train	Fine screen, flow equalization tank, activated sludge membrane bioreactors with biological nutrient removal (BNR), and chlorine disinfection.
Biosolids (Sludge) Handling:	Thickening and hauling thickened sludge to the West Boise Treatment Plant, or a landfill for initial phases, later thickening with cake solids disposed at a landfill
Flow:	Maximum month design flow is 0.42 mgd.

Outfall Location:

Outfall	Receiving Water	Lat	Long
001	Spring Valley Creek	43° 45' 49"	116° 15' 52"

Receiving Water Information

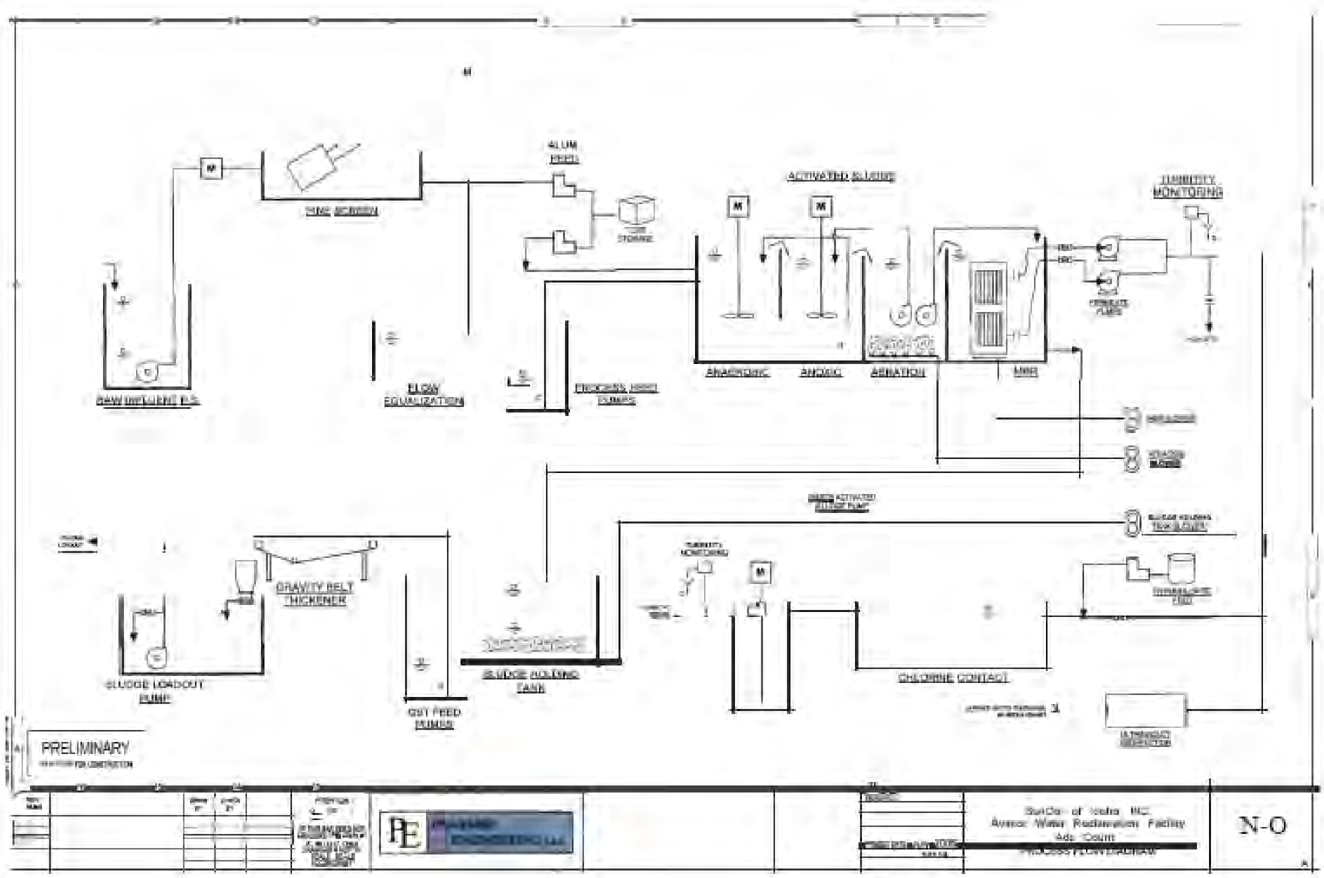
Receiving Water:	Spring Valley Creek
Watershed:	Lower Boise (HUC 17050114)

Beneficial Uses:

- Cold water aquatic life
- Primary Contact Recreation
- Agricultural Water supply
- Industrial Water supply
- Wildlife habitat
- Aesthetics

Appendix A: Process Flow Diagram

Figure A-1: Avimor Water Reclamation Facility Process Flow Diagram



Appendix B: Facility Maps & Photos

Figure B-1: Facility Map.

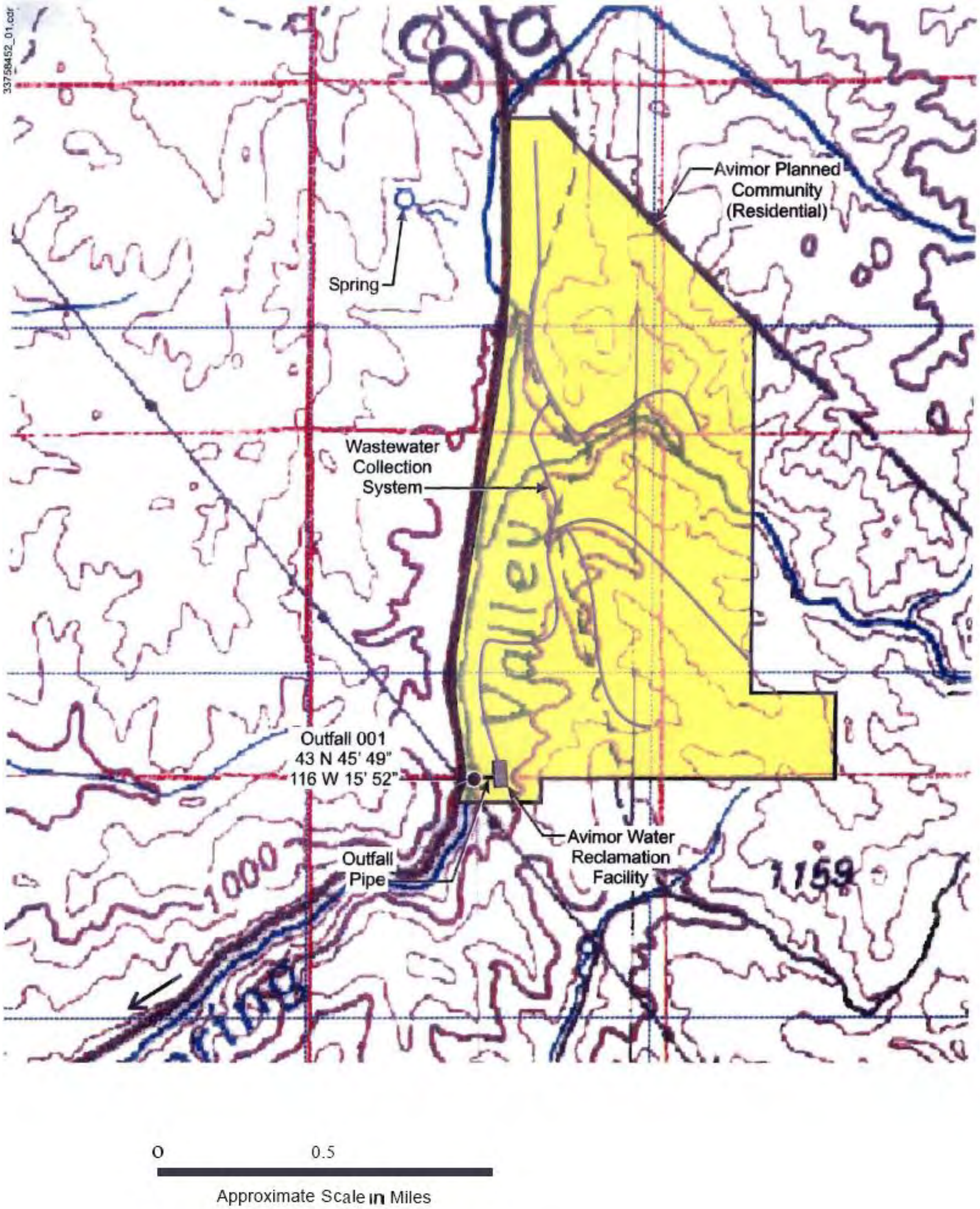


Figure B-2: Facility Location Map.

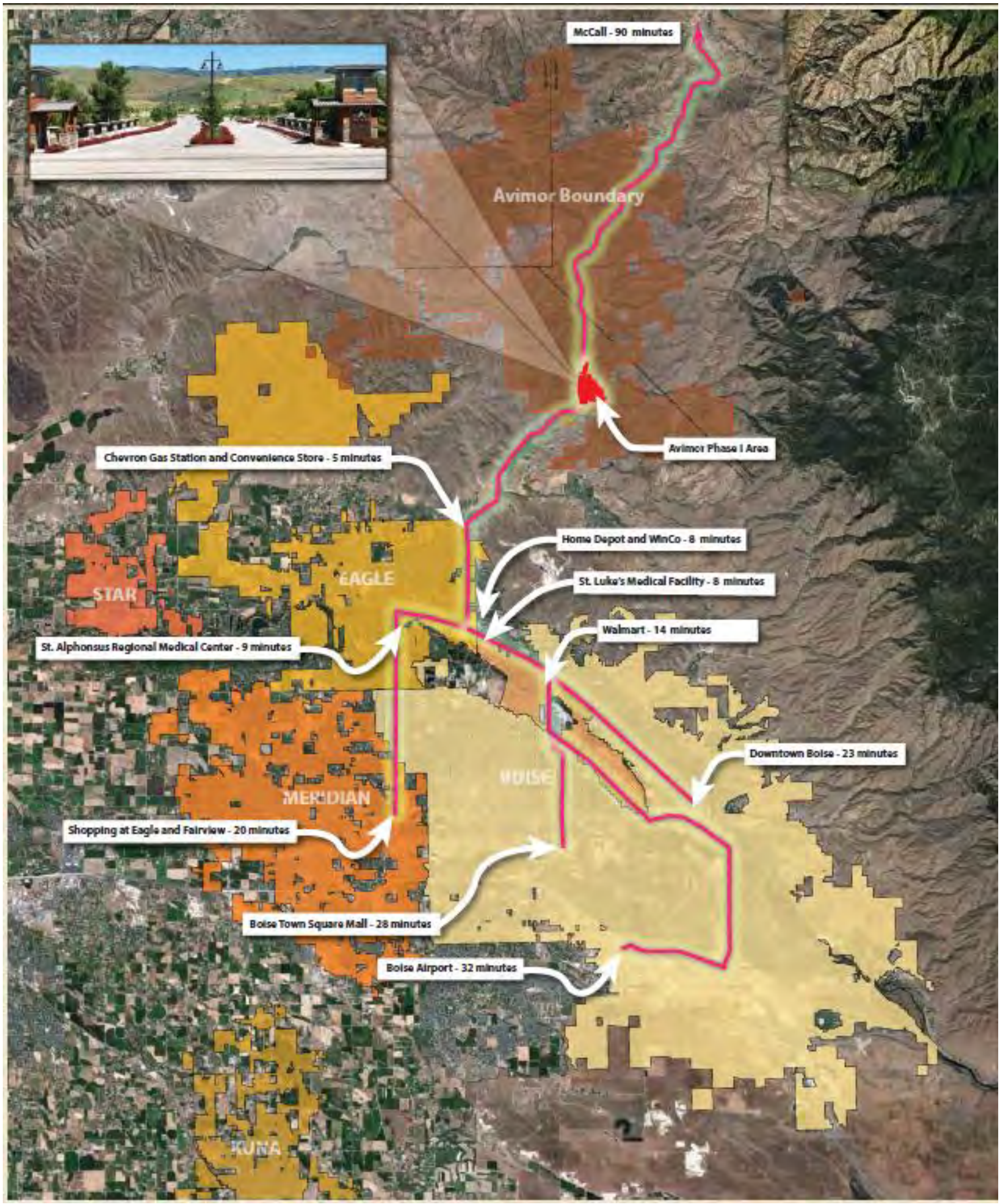


Figure B-3: Photograph of Riparian and wetland area along Spring Valley Creek. Photo taken looking west onto Hwy 55 in Ada County.

Figure B-4: Photograph of the Avimor Water Reclamation Facility.

Figure B-5: Photograph of aeration blowers at the Avimor Water Reclamation Facility.

Figure B-6: Photograph of anoxic, aeration, and MBR chambers at the Avimor Water Reclamation Facility.

Figure B-7: Photograph of permeate pumps at the Avimor Water Reclamation Facility.

Appendix C: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

In sections 301(b)(1)(B) and 304(d)(1), the Act established a performance level, referred to as "secondary treatment," which all POTWs are required to meet. EPA developed and promulgated "secondary treatment" regulations that are found in 40 CFR 133. These technology-based effluent limits apply to all municipal wastewater treatment plants, and identify the minimum level of effluent quality attainable by secondary treatment in terms of BOD_5 TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table C-1.

Table C-1: Secondary Treatment Effluent Limits
(40 CFR 133.102)

Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD_5 and TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD_5 and TSS	85% (minimum)	---	---
pH	---	---	6.0 - 9.0 s.u.

AWRF is a privately owned treatment facility, not a POTW. Where effluent guidelines have not been promulgated by EPA, the Act and NPDES regulations at 40 CFR § 125.3 require the permit writer to establish technology based effluent limits on a case-by-case basis based on Best Professional Judgment (BPJ). EPA has applied the POTW technology-based effluent limits to the AWRF permit, based on BPJ.

Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:

Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34[3]

In this case, for the monthly average technology-based BOD_5 and TSS effluent limits:

105 lb/day = 30 mg/L × 0.42 mgd × 8.34

B. Water Quality-based Effluent Limits

[3] 8.34 is a conversion factor with units (lb × L)/(mg × gallon×10^6)

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the Act requires the development of limitations in permits necessary to meet water quality standards. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the Act. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the Act requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed based on numeric criteria, EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific chemical, then the discharge has the reasonable potential to cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water meets the criteria necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Idaho Department of Environmental Quality.

Based on flow data received from the USGS for Spring Valley Creek, near Eagle, ID as well as flow data received from the facility, there is **no dilution** available in Spring Valley Creek. Because the flow for Spring Valley Creek is too low to provide dilution, the water quality-based effluent limits will be such that criteria are met before the effluent is discharged to the receiving water.

Procedure for Deriving Water Quality-based Effluent Limits

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an excursion above water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permitted discharge will not cause an excursion above the criterion. The following discussion details the specific water quality-based effluent limits in the draft permit.

Once a WLA is developed, EPA calculates effluent limits which are protective of the WLA using procedures described in Appendix E.

C. Facility-Specific Water Quality-based Effluent Limits

pH

The most stringent water quality criteria for pH are for the protection of aquatic life uses. The pH criteria for these uses state that the pH must be no less than 6.5 and no greater than 9.0 standard units. The upper bound of the water quality criteria is equal to the upper bound of the technology-based pH limits (9.0 standard units). Therefore, the pH of the effluent could not be greater than 9.0 standard units regardless of the discharges' effects on the receiving water and whether a mixing zone were authorized. In order to ensure that water quality standards for pH are met in the receiving water, the lower bound of the pH must be 6.5. Therefore, the draft pH effluent limits are a range of 6.5 to 9.0 standard units at all times.

Total Residual Chlorine

The Idaho Water Quality Standards contain water quality criteria to protect aquatic life against short term and long term adverse impacts from chlorine:

Acute criteria = 19 µg/L

Chronic criteria = 11 µg/L

EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for chlorine. Therefore, EPA has established water quality-based effluent limits for chlorine that are derived from and comply with water quality standards (see Appendix E).

Ammonia

The State of Idaho water quality standards contain criteria for the protection of aquatic life from the toxic effects of ammonia. The criteria are dependent on pH and temperature; this is because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase.

The criteria are:

$$Acute = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$$

$$Chronic = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \times 1.45 \times 10^{0.028(25-T)}$$

EPA used a pH of 8 and a temperature (T) of 18° C. These values are from NPDES Form 2A completed by the applicant. In addition, the maximum pH and temperature values were verified in the November 12, 2009 e-mail response to Ms. Lopez from Mr. Clifford Wordal, Land Development Manager for Avimor/Suncor Idaho, Inc. These values represent the maximum daily values for pH and temperature for October – March.

Inserting these values into the equations, the criteria are calculated:

$$Acute = \frac{0.275}{1+10^{7.204-8}} + \frac{39.0}{1+10^{8-7.204}} = 5.6 \text{ mg/L}$$

$$Chronic = \left(\frac{0.0577}{1+10^{7.688-8}} + \frac{2.487}{1+10^{8-7.688}}\right) \times 1.45 \times 10^{0.028(25-18)} = 1.9 \text{ mg/L}$$

EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for ammonia. Therefore, EPA has calculated water quality-based effluent limits for ammonia (see Appendix E).

E. Coli

The Idaho water quality standards state that waters of the State of Idaho that are designated for recreation are not to contain E. coli bacteria in concentrations exceeding 126 organisms per 100 ml based on a minimum of five samples taken every three to seven days over a thirty day period. Therefore, the draft permit contains a monthly geometric mean effluent limit for E. coli of 126 organisms per 100 ml, and a minimum sampling frequency of five grab samples per month (IDAPA 58.01.02.251.01.a.).

The Idaho water quality standards also state that a water sample that exceeds certain “single sample maximum” values indicates a likely exceedance of the geometric mean criterion, although it is not, in and of itself, a violation of water quality standards. For waters designated for primary contact recreation, the “single sample maximum” value is 406 organisms per 100 ml (IDAPA 58.01.02.251.01.b.ii.).

The goal of a water quality-based effluent limit is to ensure a low probability that water quality standards will be exceeded in the receiving water as a result of a discharge, while considering the variability of the pollutant in the effluent (EPA, 1991). Because a single sample value exceeding 406 organisms per 100 ml indicates a likely exceedance of the geometric mean criterion, EPA has imposed an instantaneous (single grab sample) maximum effluent limit for E. coli of 406 organisms per 100 ml, in addition to a monthly geometric mean limit of 126 organisms per 100 ml, which directly implements the water quality criterion for E. coli. This will ensure that the discharge will have a low probability of exceeding water quality standards for E. coli.

Regulations at 40 CFR 122.45(d)(2) require that effluent limitations for continuous discharges from POTWs be expressed as average monthly and average weekly limits, unless impracticable. The terms “average monthly limit” and “average weekly limit” are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are “derived from and comply with” the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

The permit must be consistent with the *Lower Boise River TMDL*. Load and wasteload allocations for bacteria in the *Lower Boise River TMDL* are concentration-based allocations equal to the State water quality criteria for bacteria. Bacteria effluent limits that apply current water quality criteria at the end of pipe are therefore consistent with the *Lower Boise River TMDL*.

Total Suspended Solids

The addendum to the *Lower Boise River TMDL*, approved by EPA on June 2008, has established wasteload allocations for TSS for the AWRF that are identical to the technology-based effluent limits. Given that the addendum to the TMDL includes a wasteload allocation that is higher than the technology-based draft effluent limits for AWRF, it is not necessary to impose more stringent water quality-based TSS limits.

Appendix D: Reasonable Potential Calculations

The following describes the process EPA has used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to excursions above Idaho's federally approved water quality standards. EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) to determine reasonable potential.

To determine if there is reasonable potential for the discharge to cause or contribute to an excursion above water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. This section discusses how the maximum projected receiving water concentration is determined.

A. Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_dQ_d = C_eQ_e + C_uQ_u \quad \text{(Equation D-1)}$$

where,

C_d = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e = Maximum projected effluent concentration
C_u = 95th percentile measured receiving water upstream concentration
Q_d = Receiving water flow rate downstream of the effluent discharge = $Q_e + Q_u$
Q_e = Effluent flow rate (set equal to the design flow of the WWTP)
Q_u = Receiving water low flow rate upstream of the discharge

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_e + Q_u} \quad \text{(Equation D-2)}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with the receiving stream and that 100% of the upstream flow may be used to dilute the effluent. However Idaho water quality standards (Section 060.01.e.iv) generally do not allow more than 25% of the receiving stream flow to be used for mixing. When only a fraction of the receiving stream flow is used for mixing, the equation becomes the following:

$$C_d = \frac{C_eQ_e + C_u(Q_u \times MZ)}{Q_e + (Q_u \times MZ)} \quad \text{(Equation D-3)}$$

where MZ is the fraction of the receiving water flow available for dilution, pursuant to of the Idaho WQS, MZ is equal to 25% (0.25), if there is available mixing.

For the AWRF a mixing zone is not allowed therefore, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \quad \text{(Equation D-4)}$$

EPA used the DFLOW computer program and daily flow data from USGS Station #13207000 (Spring Valley Creek near Eagle, ID). Using the data for Spring Valley Creek, 13207000, EPA determined that there was not sufficient flow to allow for mixing. Since dilution is not available, the AWRF must meet the water quality criteria as the end-of-pipe.

Equation D-4 is the form of the mass balance equation which was used to determine reasonable potential and calculate wasteload allocations.

B. Maximum Projected Effluent Concentration

To determine the maximum projected effluent concentration for pollutants not subject to technology-based effluent limits, EPA has used the information provided by the permittee in the application. The maximum projected effluent concentrations were set equal to the maximum concentration provided in the application for chlorine, ammonia, and phosphorus. Since AWRF is a new facility, existing effluent data are not available.

The AWRF will use chlorine for disinfection, and will have to meet effluent limits for total residual chlorine. In their application, the applicant reported that total residual chlorine concentrations would be “0 mg/L”, i.e. non-detect. In conducting the reasonable potential analysis, EPA used a chlorine concentration of 100 μg/L. The represents the minimum level (ML) of the most sensitive EPA-approved analytical method for total residual chlorine, as the maximum projected effluent concentration for chlorine.

The permittee listed the maximum projected concentration of ammonia to be 2.0 mg/L and 0.5 mg/L for phosphorous.

C. Maximum Projected Receiving Water Concentration

The discharge has reasonable potential to cause or contribute to an excursion above water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant. The maximum projected receiving water concentration is calculated from Equation D-4:

$$C_d = C_e \qquad \text{(Equation D-4)}$$

Table D-1, below, summarizes the reasonable potential calculations for ammonia, phosphorus and chlorine.

Table D-1: Reasonable Potential Calculations – AWRF

All Concentrations in ug/L unless otherwise noted

Parameter	**Total Phosphorus as P (μg/L)**	**Total Ammonia as N (mg/L)**	**Total Residual Chlorine(μg/L)**
Maximum Projected Effluent Concentration	500	2	100
Ambient Concentration	0	0	0
Maximum Projected Receiving Water Concentration	500	2	100
Acute Aquatic Life Criterion	N/A	5.62	19
Chronic Aquatic Life Criterion	N/A	1.94	11
Most Stringent Single-Value Criterion	70	N/A	N/A
Reasonable Potential?	**YES**	**YES**	**YES**

For all three parameters, the discharge has reasonable potential to exceed water quality criteria and therefore water quality-based effluent limits must be developed.

Appendix E: WQBEL Calculations - Aquatic Life Criteria

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated. The WQBELs for ammonia and chlorine are intended to protect aquatic life criteria. The following discussion presents the general equations used to calculate the water quality-based effluent limits, and then works through the calculations for the May through October ammonia WQBEL as an example. The calculations for all WQBELs based on aquatic life criteria are summarized in Table E-1.

D. Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis (Equations D-3 and D-4). To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation D-4 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{(Equation E-1)}$$

In cases where a mixing zone is not authorized either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the state doesn't authorize a mixing zone, the criterion becomes the WLA.

$$C_e = WLA = C_d \qquad \text{(Equation E-2)}$$

In the case of ammonia, the WLA are (refer to Appendix C under Ammonia):

WLA_a = 5.62 mg/L

WLA_c = 1.94 mg/L

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD) and 64 FR 71974, December 22, 1999:

$$LTA_a = WLA_a \times \exp(0.5\sigma^2 - z\sigma) \qquad \text{(Equation E-3)}$$
$$LTA_c = WLA_c \times \exp(0.5\sigma_{30}^2 - z\sigma_{30}) \qquad \text{(Equation E-4)}$$

where,

$\sigma^2 = \ln(CV^2 + 1)$
$\sigma = \sqrt{\sigma^2}$
$\sigma_{30}^2 = \ln(CV^2/30 + 1)$
$\sigma_{30} = \sqrt{\sigma_{30}^2}$
$z = 2.326$ for 99th percentile probability basis

In the case of ammonia,

CV = 0.6 (default CV, per the *TSD*)
$\sigma^2 = \ln(0.6^2+1) = 0.307$
$\sigma = \sqrt{\sigma^2} = 0.555$
$\sigma_{30}^2 = \ln(0.6^2/30 + 1) = 0.0119$
$\sigma_{30} = \sqrt{\sigma_{30}^2} = 0.109$
$z = 2.326$ for 99th percentile probability basis

Therefore,

$LTA_a = 5.62$ mg/L × exp(0.5 × 0.307 - 2.326 × 0.555)
LTA_a = 1.80 mg/L

$LTA_c = 1.94$ mg/L × exp(0.5 × 0.0119 - 2.326 × 0.109)
LTA_c = 1.52 mg/L

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below. For ammonia, the chronic LTA of 1.52 mg/L is more stringent.

E. Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$MDL = LTA \times \exp(z_m\sigma - 0.5\sigma^2)$ (Equation E-5)
$AML = LTA \times \exp(z_a\sigma_n - 0.5\sigma_n^2)$ (Equation E-6)

where σ, and σ^2 are defined as they are for the LTA equations (E-3 and E-4) and,

$\sigma_n^2 = \ln(CV^2/n + 1)$
$\sigma = \sqrt{\sigma_n^2}$
n = number of sampling events required per month = 4
$z_m = 2.326$ for 99th percentile probability basis
$z_a = 1.645$ for 95th percentile probability basis

In the case of ammonia,

MDL = 1.52 mg/L × exp(2.326 × 0.555 - 0.5 × 0.307)
MDL = 4.7 mg/L

AML = 1.52 mg/L × exp(1.645 × 0.294 - 0.5 × 0.086)
AML = 2.4 mg/L

Table E-1, below, details the calculations for water quality-based effluent limits.

Table E-1: Water Quality-Based Effluent Limits							
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations							
Parameter	**WLA Acute**	**WLA Chronic**	**LTA Acute**	**LTA Chronic**	**Coeff. Variation (CV)**	**Limiting LTA**	**# of Samples per Month**
Chlorine	19 ug/L	11 ug/L	6.1 ug/L	5.8 ug/L	0.6	5.8 ug/L	4
Ammonia	5.62 mg/L	1.94 mg/L	1.80 mg/L	1.52 mg/L	0.6	1.52 mg/L	4
Effluent Limit Calculation Summary								

Parameter	**Ambient Conc.**	**Water Quality Criterion Acute**	**Water Quality Criterion Chronic**	**Average Monthly Limit (AML)**	**Maximum Daily Limit (MDL)**	**Average Monthly Limit (AML)**	**Maximum Daily Limit (MDL)**
Chlorine	0 ug/L	19.0 ug/L	11.0 ug/L	9 ug/L	18 ug/L	0.03 lb/day	0.06 lb/day
Ammonia	0 mg/L	5.62 mg/L	1.94 mg/L	2.4 mg/L	4.7 mg/L	8 lb/day	17 lb/day

Appendix F: Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA) Fisheries and the U.S. Fish and Wildlife Service regarding potential effects an action may have on listed endangered species.

A. Endangered and Threatened Species in the Vicinity of the Discharge

EPA reviewed the U.S. Fish and Wildlife Service website for a list of endangered or threatened species in Idaho, particularly Ada County, where the AWRF is located. In addition, EPA contacted the U.S. Fish and Wildlife Service on April 1, 2008. The species list for Ada County states that the following endangered or threatened species may occur in the county:

- Gray wolf (*Canis lupus*) – Experimental/Non-essential population
- Bull trout (*Salvelinus confluentus*) – listed threatened

B. Potential Effects on Listed Species

EPA has determined that the issuance of this NPDES permit will have no effect on any of the endangered or threatened species on the Ada County species list. The rationale for this determination, for each species, is provided below.

Gray Wolf – Experimental/Non-essential population

The main threats to the gray wolf include direct human-caused mortality and habitat loss. The issuance of an NPDES permit to the AWRF will have no effect on any of these threats. Therefore, the issuance of this permit will have no effect on this species.

Bull Trout – Listed Threatened

EPA contacted the U.S. Fish and Wildlife Service, Snake River Fish and Wildlife Office on April 1, 2008 to determine if the issuance of this NPDES permit for the AWRF would have an effect on Bull Trout. According to Barbara Chaney from the U.S. Fish and Wildlife Service in an e-mail dated April 1, 2008, bull trout do not occur within the Spring Valley Creek area so it would not be affected by the proposed AWRF.

Bull trout (*Salvelinus confluentus*), is a species listed as threatened under the Endangered Species act. Bull trout do occur in Ada County, however, bull trout do not occur within the Spring Valley Creek area. The draft Bull Trout Recovery Plan for the Southwest Idaho Recovery Unit states that bull trout are known in the Boise River Recovery Subunit in three core areas in the basin upstream of Lucky Peak Reservoir. Because bull trout do not occur in the Spring Valley area, EPA has determined that the issuance of this permit will have no effect on this species.

C. References

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Appendix G: Draft Section 401 Water Quality Certification

Avimor Water Reclamation Company
Avimor Water Reclamation Facility (AWRF)

18454 North Mcleod Way
Boise, ID 83714

Permit No.:   ID-0028371

Idaho Department of Environmental Quality

Draft §401 Water Quality Certification

March 12, 2014

NPDES Permit Number(s): ID-0028371 Avimor Water Reclamation Facility

Receiving Water Body: Spring Valley Creek

Pursuant to the provisions of Section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended; 33 U.S.C. Section 1341(a)(1); and Idaho Code §§ 39-101 et seq. and 39-3601 et seq., the Idaho Department of Environmental Quality (DEQ) has authority to review National Pollutant Discharge Elimination System (NPDES) permits and issue water quality certification decisions.

Based upon its review of the above-referenced permit and associated fact sheet, DEQ certifies that if the permittee complies with the terms and conditions imposed by the permit along with the conditions set forth in this water quality certification, then there is reasonable assurance the discharge will comply with the applicable requirements of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, the Idaho Water Quality Standards (WQS) (IDAPA 58.01.02), and other appropriate water quality requirements of state law.

This certification does not constitute authorization of the permitted activities by any other state or federal agency or private person or entity. This certification does not excuse the permit holder from the obligation to obtain any other necessary approvals, authorizations, or permits.

Antidegradation Review

The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).

- Tier 1 Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).
- Tier 2 Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
- Tier 3 Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier 1 protection for that use, unless specific circumstances warranting Tier 2 protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

Pollutants of Concern

The Avimor Water Reclamation Facility discharges the following pollutants of concern: Biological Oxygen Demand (BOD_5), Total Suspended Solids (TSS), pH, *E. coli*, chlorine, ammonia, total phosphorus, temperature, nitrogen, and oil and grease. Effluent limits have been developed for BOD_5, TSS, pH, *E. coli*, chlorine, and ammonia. No effluent limits are proposed for total phosphorus, temperature, nitrogen, or oil and grease, however effluent monitoring is required. Effluent monitoring of dissolved oxygen is also required to ensure consistency with water quality standards. Required monitoring of the receiving water flow, ammonia, pH, total phosphorus, and temperature will help determine whether there is an impact to the cold water aquatic life beneficial use.

Receiving Water Body Level of Protection

The Avimor Water Reclamation Facility discharges to Spring Valley Creek within the Lower Boise Subbasin assessment unit (AU) ID17050114SW013_03 (Dry Currant and Spring valley Creeks - 3rd order sections). Spring Valley Creek is undesignated. DEQ presumes undesignated waters in the state will support cold water aquatic life and primary and/or secondary contact recreation beneficial uses; therefore, undesignated waters are protected for these uses (IDAPA 58.01.02.101.01.a). There is no available information indicating the presence of any existing beneficial use aside from cold water aquatic life and contact recreation uses.

The cold water aquatic life and secondary contact recreation uses in the Spring Valley Creek AU are fully supported (2010 Integrated Report). As such, DEQ will provide Tier 2 protection, in addition to Tier 1, for both beneficial uses (IDAPA 58.01.02.051.02; 58.01.02.051.01).

Protection and Maintenance of Existing Uses (Tier 1 Protection)

As noted above, a Tier 1 review is performed for all new or reissued permits or licenses, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires demonstration that existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. In order to protect and maintain designated and existing beneficial uses, a permitted discharge must comply with narrative and numeric criteria of the Idaho WQS, as well as other provisions of the WQS such as Section 055, which addresses water quality limited waters. The numeric and narrative criteria in the WQS are set at levels that ensure protection of designated beneficial uses.

The effluent limitations and associated requirements contained in the Avimor Water Reclamation Facility permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS. The wastewater treatment technology in this system includes primary screening, secondary biological treatment, biological nutrient removal, membrane filtration, chemical phosphorus removal and chlorine disinfection. This combination of treatment provides the most advanced wastewater effluent treatment available with current technology. Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited, and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment. A central purpose of TMDLs is to establish wasteload allocations for point source discharges, which are set at levels designed to help restore the water body to a condition that supports existing and designated beneficial uses. Discharge permits must contain limitations that are consistent with wasteload allocations in the approved TMDL.

The EPA-approved *Sediment and Bacteria Addendum to the Lower Boise River TMDL* (April 2008) establishes wasteload allocations for sediment and bacteria. These wasteload allocations are designed to ensure the lower Boise River (which Spring Creek is a tributary to) will achieve the water quality necessary to support its existing and designated aquatic life beneficial uses and comply with the applicable numeric and narrative criteria. The effluent limitations and associated requirements contained in the Avimor Water Reclamation Facility permit are set at levels that comply with these wasteload allocations.

In sum, the effluent limitations and associated requirements contained in the Avimor Water Reclamation Facility permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS and the wasteload allocations established in the *Sediment and Bacteria Addendum to the Lower Boise River TMDL*.

Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses in the Spring Valley Creek in compliance with the Tier 1 provisions of Idaho's WQS (IDAPA 58.01.02.051.01 and 58.01.02.052.07).

High-Quality Waters (Tier 2 Protection)

The Spring Valley Creek is considered high quality for cold water aquatic life and secondary contact recreation. As such, the water quality relevant to cold water aquatic life and secondary contact recreation uses of the Spring Valley Creek must be maintained and protected, unless a lowering of water quality is deemed necessary to accommodate important social or economic development.

To determine whether degradation will occur, DEQ must evaluate how the permit issuance will affect water quality for each pollutant that is relevant to cold water aquatic life and secondary contact recreation uses of the Spring Valley Creek (IDAPA 58.01.02.052.05). These include the following: BOD_5, TSS, pH, *E. coli*, chlorine, ammonia, total phosphorus, temperature, nitrogen, and oil and grease**.** Effluent limits are set in the proposed and existing permit for all these pollutants except total phosphorus, temperature, nitrogen, and oil and grease, however receiving water and/or effluent monitoring is required. For a new permit or license, the effect on water quality is determined by reviewing the difference between the existing receiving water quality and the water quality that would result from the activity or discharge as proposed in the new permit or license (IDAPA 58.01.02.052.06.a).

Pollutants with Limits in the Proposed Permit

For pollutants that will have limits under the new permit, the future discharge quality is based on the proposed permit limits (IDAPA 58.01.02.052.06.a.ii). For the Avimor Water Reclamation Facility permit, this means determining the permit's effect on water quality based upon the limits for BOD_5, TSS, pH, total residual chlorine, E. coli, and ammonia. Table 1 provides a summary of the current water quality in Spring Valley Creek and the proposed permit limits. Discharge is authorized in the proposed permit October 1 through March 31. Background receiving water concentrations are based on winter flow of 0.067 cubic feet per second (cfs) or 0.043 million gallons per day (MGD) as identified at the discharge site through monitoring by Avimor Water Reclamation Facility.

The proposed permit for Avimor Water Reclamation Facility includes new limits for TSS and *E. coli* (Table 1). These limits were included in the permit to be consistent with the wasteload allocations in the approved *Sediment and Bacteria Addendum to the Lower Boise River TMDL*. The *TSS and E. coli* limits in the proposed permit reflect a maintenance or improvement in water quality from current conditions. Therefore, no adverse change in water quality and no degradation will occur with respect to these pollutants.

In addition to these pollutants the proposed permit also includes effluent limits for BOD_5, pH, total residual chlorine, and ammonia. Because this is a new discharge, and given the comparison of the receiving water quality and flow, discharge as allowed under the limits in the proposed permit will cause an increase in the concentration of these pollutants in the receiving water, and therefore, will cause degradation.

Pollutants with No Limits

There are several pollutants of concern: total phosphorus, temperature, nitrogen, and oil and grease relevant to Tier 2 protection of aquatic life and recreation for which the proposed permit contains no limit, but does contain monitoring requirements (Table 1). For such pollutants, future discharge quality will be based on information provided by the applicant or other relevant information (IDAPA 58.01.02.052.06.a.iv). Because this is a new discharge, and given the comparison of the receiving water quality and flow, the discharge will cause an increase in the concentration of these pollutants in the receiving water, and therefore, will cause degradation.

Alternatives Analysis

In order to determine whether the degradation is necessary, an analysis must be performed that considers alternatives aimed at selecting the best combination of site, structural, managerial and treatment approaches that can be reasonably implemented to avoid or minimize the degradation of water quality (IDAPA 58.01.02.052.08.c).

Table 1. Comparison of proposed permit limits and receiving water quality for pollutants of concern.

Pollutant	Units	Background Receiving Water Quality	Proposed Permit			Pollutant Concentration Change[a]
			Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	
Pollutants with limits in the proposed permit						
Five-Day BOD	mg/L	10	30	45	—	I
	lb/day	3	105	158	—	
	% removal	—	85%	—	—	
TSS	mg/L	5	30	45	—	I
	lb/day	1.5	105	158	—	
	% removal	—	85%	—	—	
pH	standard units	7	6.5–9.0 all times			NC
E. coli	no./100 mL	50	126		406	I
Total Residual Chlorine (final)	mg/L	0	0.5	0.75	—	I
	lb/day	0	2.1	3.1	—	
Total Ammonia	mg/L	0.04	2.4	—	4.7	I
	lb/day	0.012	8		17	I
Pollutants with no limits in the proposed permit						
Flow	MGD	0.043	Report	Report		I
Total Phosphorus	mg/L	0.18	Report	—	Report	—
	lb/day	0.054				—
Temperature	°C	—	Report	—	Report	—
Dissolved oxygen		—	Report	—	Report	—
Alkalinity		—	Report	—	Report	—
Hardness		—	Report	—	Report	—
Total Kjeldahl Nitrogen	mg/L	Total Nitrogen = 0.3	Report	—	Report	—
Nitrate plus Nitrite Nitrogen	mg/L		Report	—	Report	—
Oil and Grease		—	Report	—	Report	—
Total Dissolved Solids		—	Report	—	Report	—

a – D = Decrease, I= Increase, NC = no change

The Avimor Water Reclamation Facility provided DEQ with the *Antidegradation Analysis for the Avimor Water Reuse Facility, Alternatives Analysis and Social and Economic Justification* (December 2013)), see Attachment A. This document details the six (6) treatment technology alternatives that were reviewed in the Facility Plan (2006) including: 1) relocation of the outfall to avoid discharge to a high quality water body, 2) transport of excess waste to an existing treatment facility, 3) land application of treated water, 4) discharge to a rapid infiltration system, 5) construction of a mechanical treatment plant, and 6) construction of a winter storage lagoon.

The preferred alternative for the Avimor community was determined to be the use of a combination of the above mentioned evaluated technologies to avoid surface water impacts. The Avimor Water Reclamation Facility will provide mechanical treatment via a membrane bioreactor: this treatment provides the highest level of wastewater treatment possible with current technology. Additionally, Avimor will land apply treated wastewater from the mechanical treatment plant through onsite irrigation during the growing season. During the non-growing season, treated wastewater will be discharged from the mechanical treatment facility to rapid infiltration basins up to 0.19 MGD, with any excess treated wastewater being discharged to Spring Valley Creek. The water reuse system eliminates discharge to Spring Valley Creek during the critical summer months and the rapid infiltration system reduces the volume of discharge to Spring Valley Creek during the winter months.

While the preferred alternative is not the least degrading option, it is the best alternative in terms of cost effectiveness at pollution reduction and the selection of this alternative is justified in accordance with IDAPA 58.01.02.052.08.c.iv(4).

Socioeconomic Justification

As previously noted, Avimor Water Reclamation Facility provided DEQ with an Antidegradation Analysis document that included a social and economic justification.

The wastewater treatment facility is a critical service for the affected community. Without wastewater treatment, the community would face significant environmental and public health consequences, as well as economic impacts. The winter storage alternative would allow for elimination of all discharge to Spring Valley Creek, but requires a large storage lagoon which only provides a small increase in pollutant reduction. This alternative is not economically justifiable based on the very low concentration of pollutants discharged to Spring Valley Creek during the non-critical period. Given these factors, as well as other information provided by Avimor Water Reclamation Facility in its social and economic justification, DEQ has determined that the degradation that will result from the preferred alternative is socially and economically justified.

Other Source Controls

In allowing degradation in high quality waters, DEQ must assure that there shall be achieved in the watershed the highest statutory and regulatory requirements for all new and existing point sources and cost-effective and reasonable best management practices (BMPs) for all nonpoint source controls (IDAPA 58.01.02.052.08.b). Avimor Water Reclamation Facility is the only point source to Spring Valley Creek. Compliance with the new NPDES permit will ensure the highest statutory and regulatory requirements for point sources shall be achieved.

Nonpoint sources of pollution in the watershed include stormwater, livestock grazing and irrigated agriculture. Cost effective and reasonable BMPs are identified in the WQS as those set forth in the Idaho Agricultural Pollution Abatement Plan. The Avimor Planned Community has implemented projects including BMPs from the Idaho Agricultural Pollution Abatement Plan to restore stream banks, fence off and re-vegetate stream and spring areas, and create a wetland treatment basin to decrease sediment transport from the upper Spring Valley Creek watershed. In the developed community property, engineered stormwater retention ponds reduce pollutant transport from public areas and residential and commercial property. Reclaimed wastewater will be used to irrigate the common areas of the development and in the future may also be used to irrigate 100 acres of agricultural land. The requirements set forth in the wastewater reuse permit are considered by DEQ to be cost effective and reasonable BMPs.

DEQ has determined that cost effective and reasonable BMPs as set forth in the Idaho Agricultural Pollution Abatement Plan, in the Avimor reuse permit and in connection with the management of stormwater are being implemented in the watershed. In sum, there is reasonable assurance that there shall be achieved the highest statutory and regulatory requirements for point sources and cost-effective and reasonable BMPS for non-point source control.

Other Conditions

This certification is conditioned upon the requirement that any material modification of the permit or the permitted activities—including without limitation, any modifications of the permit to reflect new or modified TMDLs, wasteload allocations, site-specific criteria, variances, or other new information—shall first be provided to DEQ for review to determine compliance with Idaho WQS and to provide additional certification pursuant to Section 401.

Right to Appeal Final Certification

The final Section 401 Water Quality Certification may be appealed by submitting a petition to initiate a contested case, pursuant to Idaho Code § 39-107(5) and the "Rules of Administrative Procedure before the Board of Environmental Quality" (IDAPA 58.01.23), within 35 days of the date of the final certification.

Questions or comments regarding the actions taken in this certification should be directed to Lauri Monnot, Boise Regional Office, at 208.373.0461 or Lauri.Monnot@deq.idaho.gov.

DRAFT

Pete Wagner
Regional Administrator
Boise Regional Office

Antidegradation Analysis for the Avimor Water Reuse Facility

Alternatives Analysis and Social and Economic Justification

PHARMER
ENGINEERING LLC

December, 2013

Antidegradation Analysis for the Avimor Water Reuse Facility

December 31, 2013

PROFESSIONAL ENGINEER
LICENSED
15127
STATE OF IDAHO
JEREMY M. AULBACH
12/31/13

Prepared By

PE PHARMER ENGINEERING LLC

Contents

Background

The Avimor Water Reuse Facility (WRF) was designed and built in 2008 based on best available technology and with the most stringent National Pollutant Discharge Elimination System (NPDES) effluent limits in mind. The WRF has the capabilities to produce the highest effluent water quality in the state. The WRF system is designed to reuse all of the water discharged from the Avimor Planned Community (APC) onsite with no discharge to surface waters except during maintenance events or if the rapid infiltration system is not capable of receiving the full discharge flows during the winter months.

The original NPDES permit application was submitted in August of 2006. Since this time, the Idaho Antidegradation Review Policy was implemented. Due to this new addition to the Idaho Administrative Code, the Avimor WRF is submitting this documentation to meet the requirements of the newly added laws.

The Avimor Planned Community (APC) is being developed on the Spring Valley Ranch property which covers approximately 32,000 acre The APC is located approximately 10 miles north of Eagle, Idaho, and just east of State Highway (Hwy) 55. Avimor will ultimately be located in portions of Ada, Boise, and Gem counties. The existing topography of the area ranges from relatively flat fields and pasture to moderately steep creek drainage valleys and steep side hills, with some rock outcroppings. The portions of the property that will be developed lie generally in the valley bottoms of two separate drainages and their tributaries. Residential, commercial, and institutional property will cover 9,200 acres of the development.

The two drainages are Spring Valley Creek and Willow Creek. These natural drainage basins are separated by a ridge running generally east to west. The Spring Valley Creek basin drains from the north to the south and includes the majority of the developed area, while the Willow Creek basin drains from the northeast to the southwest. The natural basins will also generally form the drainage basins for the wastewater collection system. The Avimor Water Reclamation Facility (AWRF) will serve the wastewater treatment needs of the Spring Valley Creek basin. A separate facility will serve the wastewater treatment needs of the Willow Creek basin. This NPDES Tier II Antidegradation Evaluation covers only the Avimor WRF. A separate NPDES permit application will be filed in the years to come for the Willow Creek Treatment Facility, as the APC develops.

The land use within Avimor will be a combination of mixed-use core area, multi-family and single-family residential properties, and large areas of open space. The key element of land use relevant to the wastewater system is the number of residential properties and the size of the commercial properties. The relevant land use types identified for APC include the following: single-family residential, multi-family residential and commercial.

The proposed project will be constructed in an area located several miles beyond the service areas of any existing municipal wastewater collection and treatment systems. This area was previously used for dryland grazing. The distance from the APC to existing wastewater services is approximately 12 miles to the West Boise Watewater Treatment Facility and 8 miles to the Eagle Sewer District Treatment Facility. Trucking of the waste to the Eagle Sewer District was performed originally, until the wastewater flows were adequate to support the biological activity of the system. Long term trucking of the waste will be discussed in added detail in the report.

This document serves to address the requirements of the Idaho Administrative Code IDAPA 58.01.02.08, which states "The Department may allow significant degradation of surface water quality that is better than assigned criteria only if it is determined to be necessary to accommodate important economic or social development in the area in which the waters are located." This document will show that all means of minimizing the degradation of the high quality water of Spring Valley Creek have been incorporated into the design of the Avimor WRF, the degradation will be minimal and will not affect any beneficial uses of Spring Valley Creek, and will provide important economic and social development of the area.

Alternatives Analysis

IDAPA 58.01.02.08.c. states "Degradation will be deemed necessary only if there are no reasonable alternatives to discharging at the levels proposed. The applicant seeking authorization to degrade high water quality must provide an analysis of alternatives aimed at selecting the best combination of site, structural, managerial and treatment approaches that can be reasonably implemented to avoid or minimize the degradation of the water quality." The alternatives analysis detailed below will show that the Avimor WRF has incorporated every means necessary to minimize impacts to Spring Valley Creek and has eliminated impacts during the most critical periods of the year. A significant effort was made during the planning phase to identify the most environmentally responsible method for wastewater treatment at the APC. 100% water reuse within APC is the ultimate goal of the Avimor WRF, and the combination of high treatment levels and flexible reuse options will allow that goal to be reached. The Antidegradation review documents requires that the discharge to a high quality water evaluate the following items:

1) Relocate outfall
2) Truck to existing facility
3) Treatment and discharge to Spring Valley Creek
4) Process changes/improved efficiency which reduce pollutant load
5) Offsets for water quality
6) Seasonal discharge to avoid critical time periods for water quality
7) Non-discharge alternatives

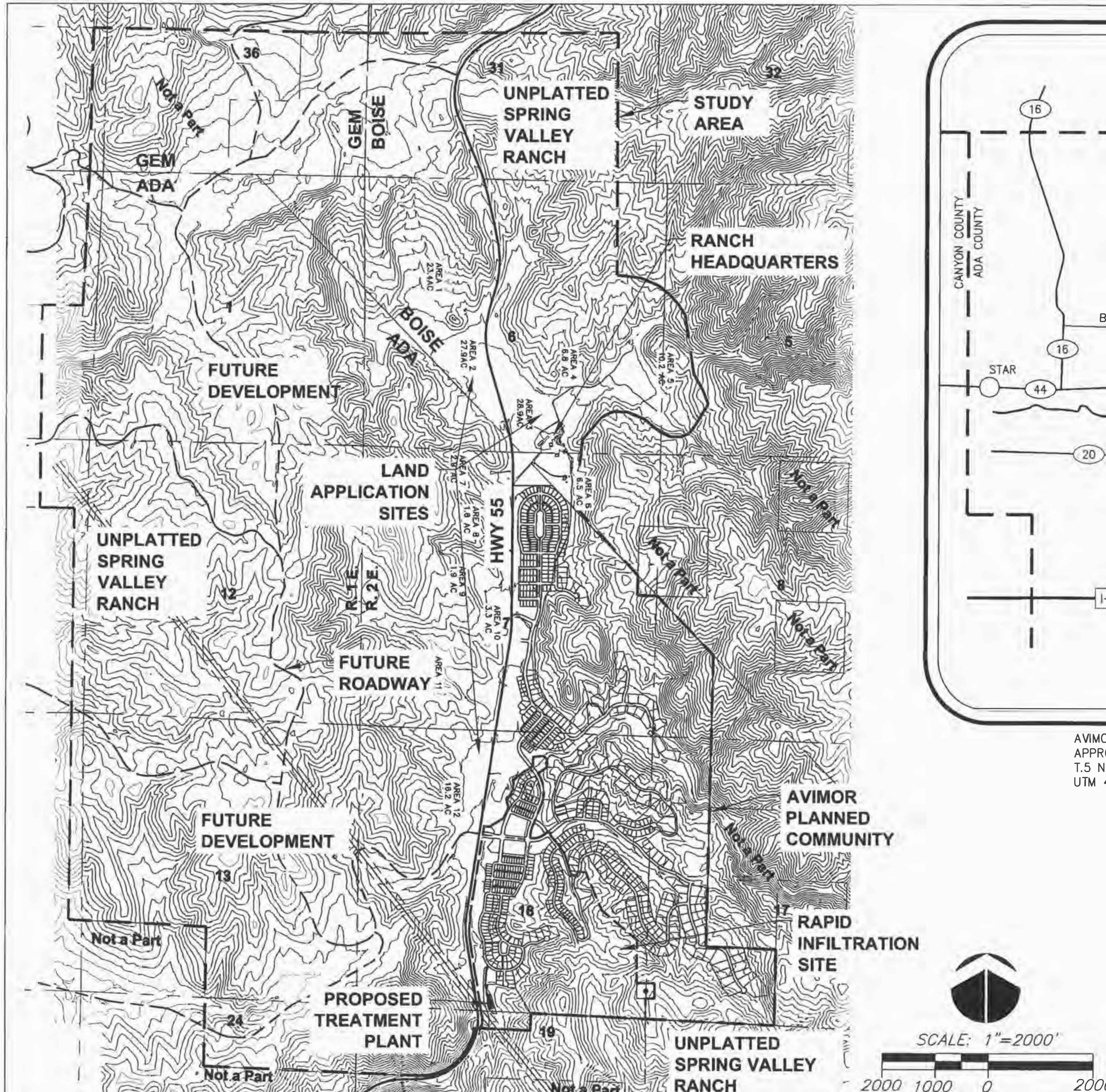
The Avimor WRF has evaluated each of the above items along with many more alternatives which will reduce the degradation to Spring Valley Creek from a discharge of treated wastewater. A combination of each of items 3-6 above have been incorporated into the system. The items evaluated in the alternative analysis include:

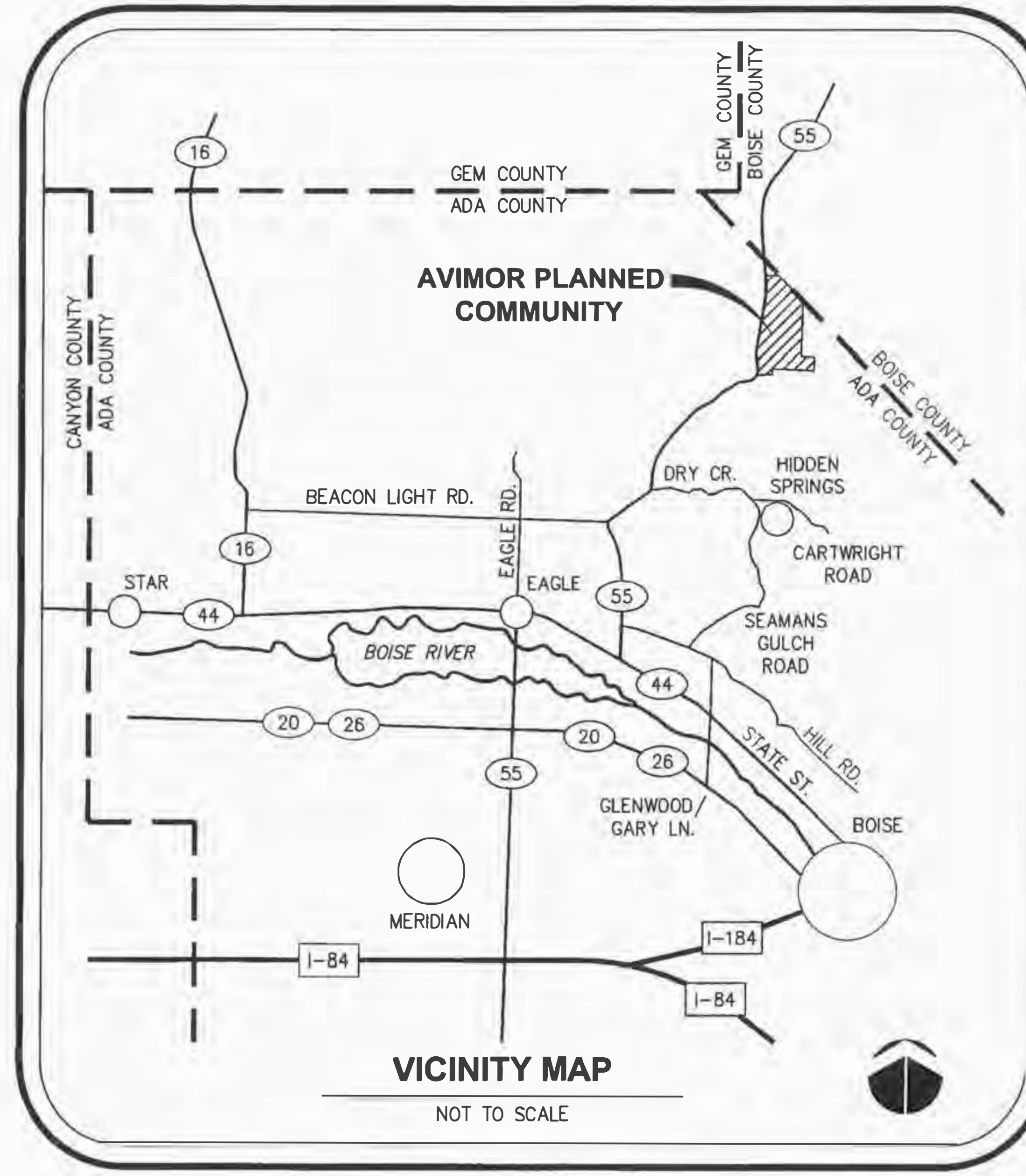
1) Relocation of outfall
    a. Do not discharge to a high quality water
2) Truck to an existing facility
    a. Eliminate wastewater treatment via trucking waste to an alternative treatment location
3) Treatment and discharge to Spring Valley Creek
    a. Treat wastewater to remove pollutants prior to discharge to a surface water on a year round basis
4) Land Application via irrigation reuse
    a. Treat wastewater to remove pollutants, then reuse water for irrigation onsite during the growing season
5) Land application via groundwater recharge
    a. Treat wastewater to remove pollutants, then reuse the water for irrigation onsite, then discharge to rapid infiltration basins for groundwater recharge during the non-growing season
6) Seasonal discharge to surface water
    a. Treat wastewater to remove pollutants, discharge to a reuse system during the growing season, discharge to rapid infiltration basins during non-growing season, discharge excess treated water to surface water

7) Winter storage and land application
    a. Treat wastewater to remove pollutants, discharge to irrigation system during non-growing season, store water in lagoons and holding tanks during non-growing season, then pump to irrigation system during growing season

Relocation of outfall

Relocation of the outfall from the high quality waters of Spring Valley Creek do not exist. Alternate discharge locations for the Avimor Water Reuse Facility (WRF) are not available due to the location of the planned community. Avimor Planned Community (APC) is located along the main channel of Spring Valley Creek in the lower portion of the Spring Valley Creek watershed basin. Two additional streams are located near or within the APC, these are the North Fork of Spring Valley Creek and Burnt Car Draw; both of these streams drain to Spring Valley Creek. Moving the outfall to the two alternate streams would not relieve the degradation associated with the main stem of Spring Valley Creek. A map of the APC and the Avimor WRF are shown in Figure 1.





VICINITY MAP

NOT TO SCALE

AVIMOR PLANNED COMMUNITY, ADA COUNTY, IDAHO
APPROXIMATELY 6.8 MILES NORTHEAST OF EAGLE, IDAHO
T.5 N., R. 2 E., SECTION 18 (CENTROID)
UTM 4,847,000mN., 559,500mE

INDEX OF SHEETS

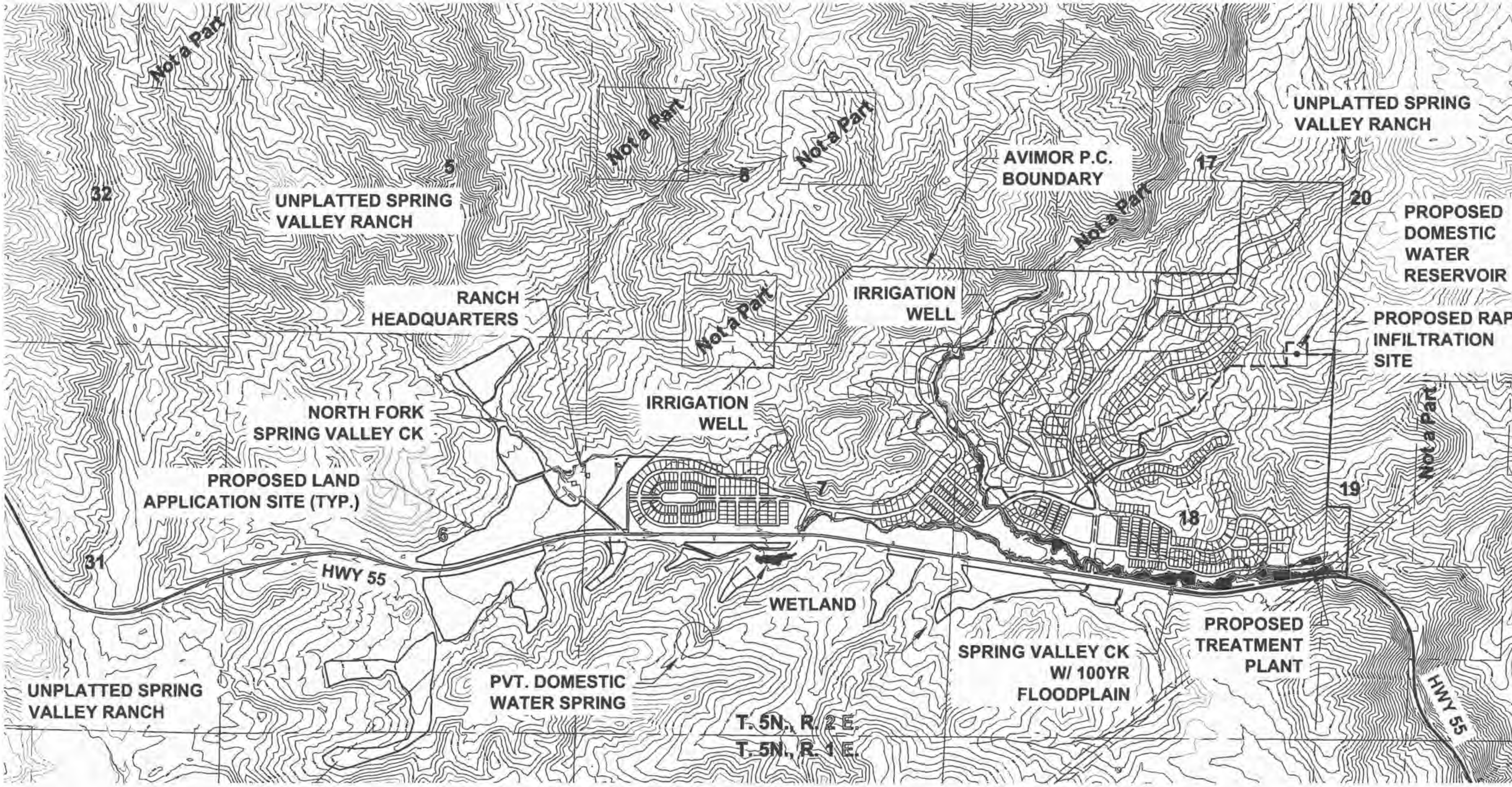
C100 OVERALL VICINITY MAP

AVIMOR WASTE WATER RECLAMATION FACILITY
OVERALL VICINITY MAP

AVIMOR, LLC.
Ada County, Idaho

PROJECT NO. SCR4782.00
DATE: 2006-07-02
BY: BLW
SHEET NO. 1 OF 5

W R G
DESIGN INC
453 S. Fitness Place, Eagle ID 83616
Tel. 208.246.8300 Fax. 208.246.8320



NOTES:
1. WETLAND AREAS ARE LIMITED TO THE INCISED CHANNELS OF SPRING VALLEY CREEK AND THE NORTH FORK OF SPRING VALLEY CREEK UNLESS OTHERWISE NOTED.

2. PUBLIC GATHERING SPACES WILL BE DISTRIBUTED THROUGHOUT THE PROPOSED DEVELOPMENT.

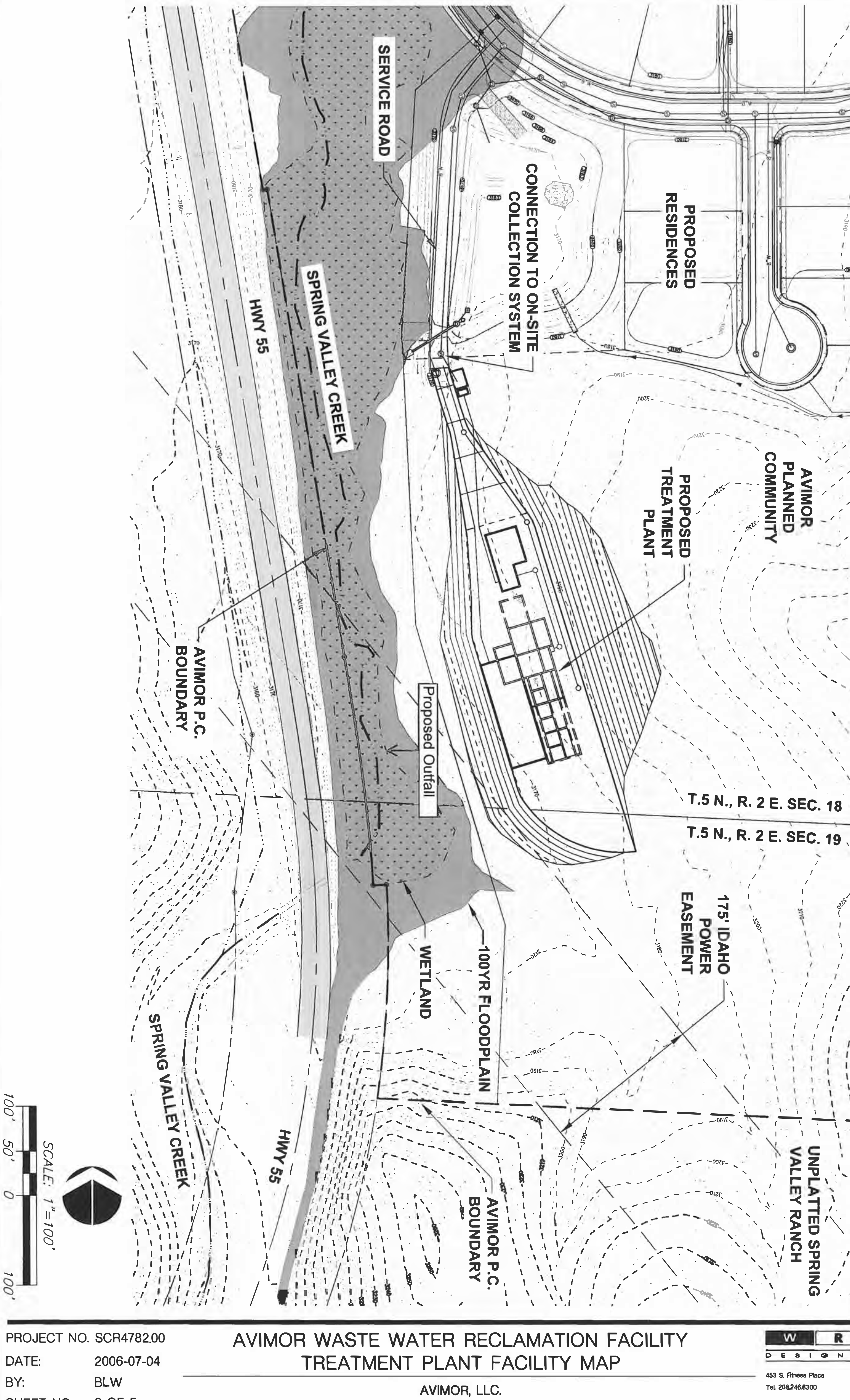
SCALE: 1"=1500'
1500' 750' 0 1500'

W R G DESIGN INC
453 S. Fitness Place Eagle, ID 83616
Tel. 208.246.8300 Fax. 208.246.8320

AVIMOR WASTE WATER RECLAMATION FACILITY
SITE VICINITY MAP

AVIMOR, LLC.
Ada County, Idaho

PROJECT NO. SCR4782.00
DATE: 2006-07-02
BY: BLW
SHEET NO. 2 OF 5



PROJECT NO. SCR4782.00
DATE: 2006-07-04
BY: BLW
SHEET NO. 2 OF 5

AVIMOR WASTE WATER RECLAMATION FACILITY
TREATMENT PLANT FACILITY MAP

AVIMOR, LLC.
Ada County, Idaho

WRG DESIGN INC.
453 S. Fitness Place
Eagle, ID 83616
Tel. 208.246.8300
Fax. 208.246.8320
PLANNERS • ENGINEERS • LANDSCAPE ARCHITECTS • SURVEYORS

Truck to an Existing Facility

Trucking of wastewater to an existing facility for ultimate disposal was performed at the Avimor WRF when the loadings to the plant were not great enough to support full biological communities. Trucking of the wastewater was a significant cost on a per gallon basis. The long-term approach to trucking wastewater to the nearby treatment systems of West Boise Wastewater Treatment system or to the Eagle Sewer District treatment systems are not allowable under the IDEQ rules. The trucking of wastewater was allowed as a short term alternative while the APC was under construction. Additionally, the fully flows and loads cannot be treated via the lagoon treatment system of the Eagle Sewer District without treatment capacity increases via capital expenditure. The West Boise WWTF does have capacity to treat the wastewater generated from within the APC, but is not willing to support the APC in this manner.

Treatment and Discharge to Spring Valley Creek

Treatment of the wastewater via a mechanical wastewater treatment plant was ultimately selected for the Avimor WRF due to the flexibility of disposal options and the desire of the system to ultimately reuse 100% of the wastewater generated within the APC. Discharge to Spring Valley Creek from the Avimor WRF is detailed in this section. The alternative of year round discharge to Spring Valley Creek, without water reuse is not a desire of the system and ultimately is not the selected treatment methodology. To fully understand the reality of discharging to Spring Valley Creek as summary of the Draft NPDES permit development is detailed in the following section.

Draft NPDES Permit Background

The Avimor Water Reuse Facility has received the Draft Permit # ID-0028371 which will allow seasonal discharge of treated wastewater to Spring Valley Creek which is a tributary to Dry Creek, which is a tributary to the Boise River. The Draft NPDES permit limits are based on water quality standards as set forth in Section 301(b)(1)(C) of the Clean Water Act (Act) which aim to protect the beneficial uses of the receiving stream. Spring Valley Creek will be protected for primary contact recreation beneficial uses under the NPDES permit.

Spring Valley Creek is fully supporting its beneficial uses designated under Assessment Unit ID17050114SW013. However Spring Valley Creek is a tributary to Dry Creek (not assessed) which is a tributary to a water quality limited segment of the Boise River. The Boise River is water quality limited for total phosphorus, sediment, temperature and bacteria. Due to the water quality limited status of the Boise River, the Avimor WRF sediment and bacteria limits are based on the total maximum daily load (TMDL) waste load allocations (WLA) identified in the Lower Boise River TMDL.

The Snake River Hells Canyon (SRHC) TMDL identifies the phosphorus load from the Boise River as contributing to the impairment of the Snake River. The SRHC TMDL calls for a 0.07 mg/L in stream concentration of the Boise River prior to discharge to the Snake River. Spring Valley waters reach the Boise River, phosphorus discharged to Spring Valley Creek will contribute to this loading. The SRHC TMDL identifies the season of phosphorus impairments as beginning May 1st and ending September 30th. Because the Avimor WRF will have only a seasonal discharge to Spring Valley Creek which does not coincide with the May 1st through September 30th phosphorus impairment season, the Avimor WRF will not be limited in its phosphorus discharge.

The proposed effluent limitations for the Avimor WRF are listed in Table 1. The mass based limitations for BOD, TSS, chlorine, and ammonia are based on a plant maximum flow of 0.42 mgd. The permitted flow from the plant represents the first phase of the treatment system which will have the ultimate flow capacity of 1.0 mgd following construction of phases 2 and 3. The loading listed in the draft permit will be used as the basis for the Antidegradation discussion in this report, but significantly lower concentrations of pollutants will be discharged from the facility.

Table 1 Effluent Limitations and Monitoring Requirements from the Draft NPDES Discharge Permit

Parameter	**Units**	**Effluent Limitations**			**Monitoring Requirements**		
		Average Monthly Limit	**Average Weekly Limit**	**Maximum Daily Limit**	**Sample Location**	**Sample Frequency**	**Sample Type**
Flow	mgd	Report	—	Report	Effluent	continuous	Recorder
Biochemical Oxygen Demand (BOD_5)		30	45	—	fluent and Effluent		24-Hour Composite
	lb/day	105	158	—			
Total Suspended Solids	mg/L	30	45	—	Influent and Effluent	2/week	24-Hour Composite
	lb/day	105	158	—			
pH	s.u	6.5-9.0			Effluent	5/week	Grab
E. Coli Bacteria[1,2]	#/100 ml	126	—	406	Effluent	5/month	Grab
Total Residual Chlorine[2,4]	µg/L	9	—	18	Effluent	5/week	Grab
	lb/day	0.03	—	0.06			
Total Ammonia as N[2]	mg/L	2.4	—	4.7	Effluent	2/week	24-Hour Composite
	lb/day	8	—	17			
Total Phosphorus as P	mg/L	Report	—	Report	Effluent	1/month	24-Hour Composite
Temperature[3]	°C	Report	—	Report	Effluent	Continuous	Meter
Dissolved Oxygen	mg/L	Report minimum and average			Effluent	2/month	Grab
Alkalinity	mg/L as $CaCO_3$	Report	—	Report	Effluent	1/quarter[4]	24-Hour Composite
Hardness	mg/L as $CaCO_3$	Report	—	Report	Effluent	1/quarter[4]	24-Hour Composite
Total Kjeldahl Nitrogen	mg/L	Report	—	Report	Effluent	1/quarter[4]	24-Hour Composite
Nitrate Plus Nitrogen	mg/L	Report	—	Report	Effluent	1/quarter[4]	24-Hour Composite
Oil and Grease	mg/L	Report	—	Report	Effluent	1/quarter[4]	Grab
Total Dissolved Solids	mg/L	Report	—	Report	Effluent	1/quarter[4]	24-Hour Composite

Notes:

1. The E. Coli bacteria counts must not exceed a monthly geometric mean of 126/100 ml and a single sample (instantaneous) maximum of 406 organisms per 100 ml. See Part V for the definition of geometric mean.
2. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Parts I.B.2 and III.G.
3. See temperature monitoring details above.
4. Quarters are defined as January through March, and October through December. Monitoring results for pollutants with a sample frequency of quarterly must be reported on the March and December DMRs.
5. See I.B.6, I.B.7, I.B.8, and I.B.9.

Process changes/improved efficiency that reduces pollutant discharge

The Avimor Water Reuse Facility is a mechanical treatment plant which is optimized for extremely high levels of treatment. The Avimor WRF is a membrane bioreactor facility with biological nutrient removal coupled with chemical phosphorus removal. The Avimor WRF represents the most advanced wastewater treatment system available with current technology. The system includes primary screening, secondary biological treatment, biological nutrient removal, membrane filtration, chlorine disinfection, sludge dewatering and chemical phosphorus removal. A process flow diagram for the Avimor WRF is shown in Figure 4.

The anticipated discharge quality from the Avimor WRF are listed in Table 2. The proposed NPDES discharge permits issued contain limits six times higher for biochemical oxygen demand (BOD). Additionally the total suspended solids (TSS) discharged from the facility will be blow 1 mg/L and will be measured using NTU units rather than mg/L due to the low concentrations. The proposed NPDES discharge permit allows TSS concentrations to average 30 mg/L.

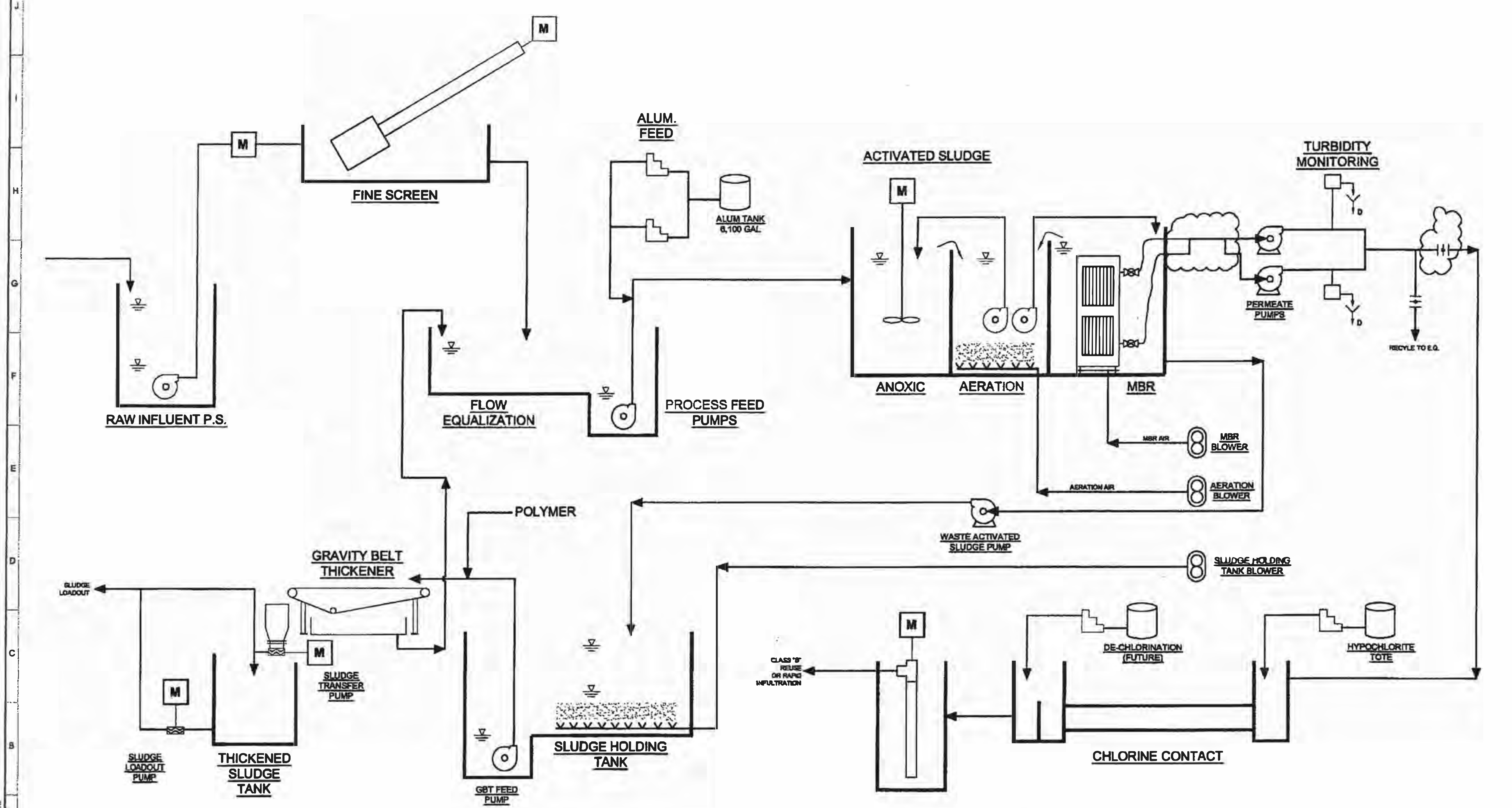
Table 2 Anticipated Wastewater discharge quality from the Avimor WRF

Parameter	Summer	Winter
Biochemical oxygen demand (BOD)	< 5.0 mg/L	< 5.0 mg/L
Total nitrogen (TN)	< 8.0 mg/L	< 8.0 mg/L
Total phosphorus (TP)	< 0.1 mg/L	< 0.1 mg/L
Turbidity	< 2.0 NTU	< 2.0 NTU
Total coliform	<2.2 cts/100 ml	<2.2 cts/100 ml

Secondary wastewater treatment facilities discharge 3-4 mg/l of total phosphorus (TP) without biological nutrient removal or chemical nutrient removal. The Avimor WRF plans to combine both biological and chemical phosphorus removal to reach a TP concentration of 0.1 mg/L. The background concentrations of phosphorus within Spring Valley Creek ranges between 0.10 mg/L and 0.24 mg/L. The background concentration of total nitrogen ranges from 0.2 mg/L to 0.7 mg/L.

Level 1 nitrogen removal is provided via biological nitrification and denitrification which converts influent ammonia to nitrogen gas which is removed from the system via diffusion from the biological basins. Level 1 nitrogen removal can consistently meet total nitrogen concentrations of 8.0 mg/L.

Impacts to Spring Valley Creek are discussed in the following sections. For the Antidegradation review, the actual permitted inputs to Spring Valley Creek must be used to evaluate the degradation levels. It can be seen in this section, that the impacts to Spring Valley Creek will be significantly less than the NPDES permitted levels due to the high level of treatment provided by the MBR treatment system.



REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
1	CONFORMED SET	JRH	CWH	12-04-08

ATTENTION: 0 1/2 1 — IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PHARMER ENGINEERING L.L.C.

AVIMOR

Original Signed by: C. Hipwell
Date Original Signed: 12/12/08
PROFESSIONAL ENGINEER REGISTERED 10816 STATE OF IDAHO
Originals stored at: Pharmer Engineering, L.L.C. 671 East Riverpark Ln Suite 140 Boise, Id. 83706 208.433.1900

DESIGNED:	DSB
DRAWN:	TMB
CHECKED:	BSB
APPROVED:	CWH
PROJECT DATE:	Dec. 2008
PROJECT NO.:	10150
SCALE:	NTS

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

PROCESS FLOW DIAGRAM

DRAWING NUMBER: N-0
REV 1

CONFORMED SET - FOR CONSTRUCTION

.DWG
FILENAME:

Non-discharge alternatives such as land application

Water Reuse via Onsite Irrigation Land Application

The Avimor WRF has incorporated an elaborate water reuse system to allow the APC common areas to be irrigated via treated wastewater. The water reuse system is permitted under Idaho Wastewater Reuse Permit No. M-211-03. The wastewater is reused via the land application system during the growing season to irrigate 15.7 acres of common area within the APC. As wastewater generation increases, the Avimor WRF will grow to include irrigation of an additional 100 acres for agricultural lands. A map of the irrigation system is shown in Figure 5.

The onsite irrigation system includes to the Avimor WRF which treats water to a very high quality which allows for minimal public setbacks and limitations on the water reuse. The irrigation system utilizes treated water from the treatment system, supplemental surface irrigation water, and supplemental ground water from multiple groundwater wells located in the APC. A 500,000 gallon treated water storage tank and booster station was installed to allow the irrigation system to utilize water at a constant rate while the wastewater treatment system experiences normal daily fluctuations in influent.

The irrigation system features a fully automated water monitoring system to allow tracking of the wastewater reused, supplemental surface water applied, and supplemental groundwater applied. The water reuse system represents a significant investment towards providing 100% water reuse within the APC.

PE PHARMER ENGINEERING

10347-Avimor (Fig-1) 7-10-13

FIGURE 1

Reclaimed Water
Irrigation Hydraulic
Management Unit MU-021115

Avimor Planned Unit Development

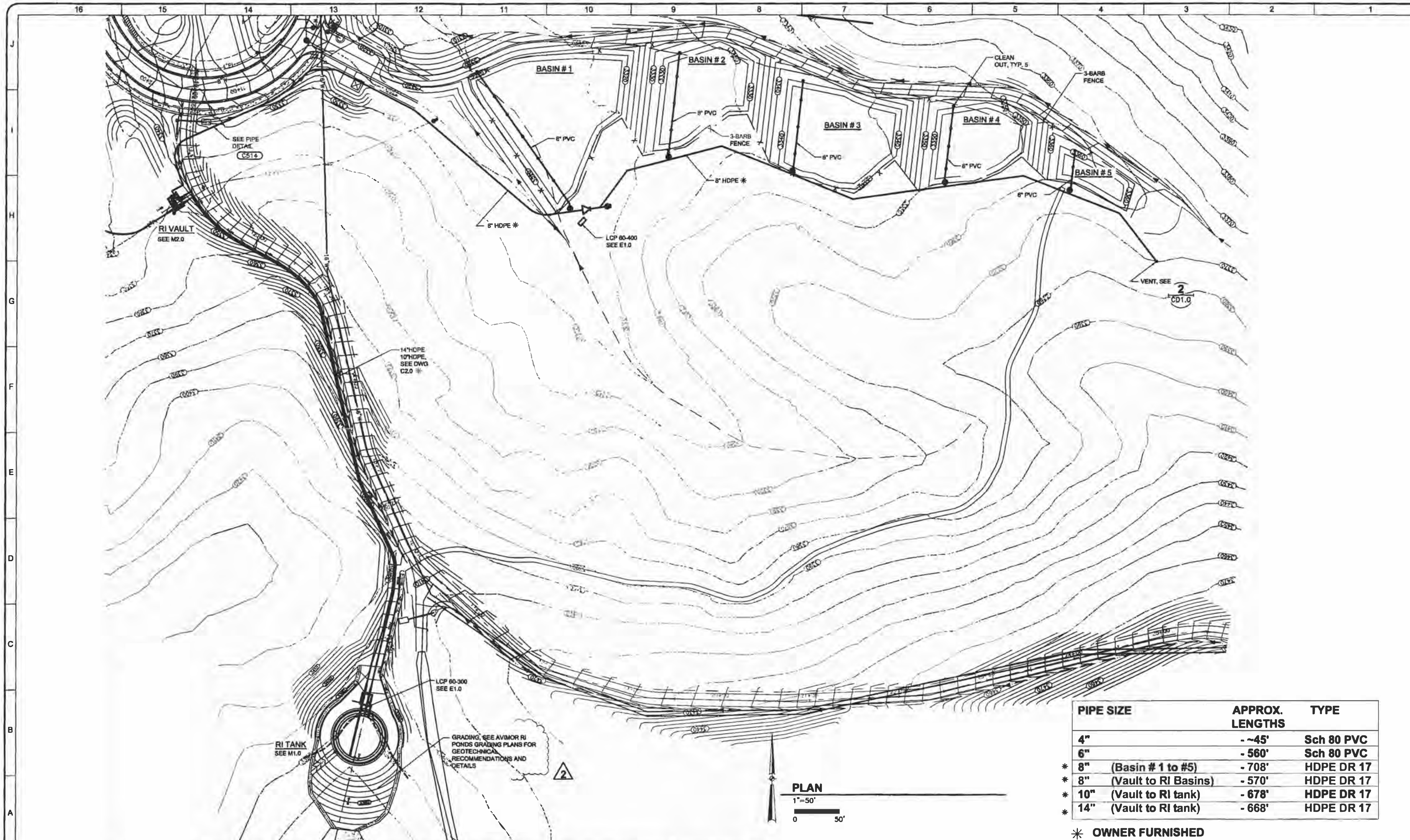
Water Reuse via Groundwater Recharge via Rapid Infiltration Basins

The irrigation system within the APC does not apply water during the non-growing months. Water generated within the APC and treated by the Avimor WRF is discharged to rapid infiltration (RI) basins during these months.

The RI basins consist of five basins with a pipeline distribution system and programmable control valves. The five basins are grouped into 3 zones for dosing on a 3-day cycle (i.e. one day on two days off). The design capacity of the RI Basins, with bottom area of 0.68 acres is based on an Initial Design Application Rate of 0.19 mgd. This results in a hydraulic loading rate of 3.1 ft/day, which is about 20% of the measured infiltration rate (16ft/day) for the clayey sand subsoils. Because infiltration water is expected to spread horizontally over the subsoils, the effective application rate would be 0.22 ft/day, or about 1 percent of the measured rate. This suggests that a much higher potential application rate, exceeding 0.91 mgd, is possible when considering the effective area of 2.7 acres. The RI system also incorporates the 500,000 gallon storage tank to allow for equalization of the flows delivered to the RI basins with varying influent flow rates to the Avimor WRF.

The Initial Design Application Rate of 0.19 mgd is not adequate for the current installed capacity of the Avimor WRF of 0.33 mgd, nor is it adequate for the ultimate build-out capacity of the Avimor WRF. The differential between the 0.19 mgd capacity of the RI system and the 0.33 mgd installed capacity of the treatment system requires the ability to discharge to Spring Valley Creek or store water during the non-growing season. A map of the rapid infiltration basis in shown in Figure 6.

What is not being included in the Anti-degradation evaluation presented here is the planned aquifer storage and recovery program which will further reduce discharges to Spring Valley Creek. The geotechnical reviews of the RI area, show that it is underlined by a very impermeable layer which creates a basin which can be used for winter storage. The basin may be filled during winter RI applications, then the water will be withdrawn for supplemental irrigation water to the growing season reuse water. These wells have not been installed or permitted with IDWR, as there is a proving period underway for the impermeability of the underlying basin.



PIPE SIZE		APPROX. LENGTHS	TYPE
4"		- ~45'	Sch 80 PVC
6"		- 560'	Sch 80 PVC
* 8"	(Basin # 1 to #5)	- 708'	HDPE DR 17
* 8"	(Vault to RI Basins)	- 570'	HDPE DR 17
* 10"	(Vault to RI tank)	- 678'	HDPE DR 17
* 14"	(Vault to RI tank)	- 668'	HDPE DR 17

✳ OWNER FURNISHED

REV NUM	DESCRIPTION	DRWN BY	CHK'D BY	DATE
1	REVISIONS	JRH	BSB	11/09/07
2	REVISIONS	JRH	BSB	11/15/07

ATTENTION: 0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" @ 22x34 or ½" @ 11x17, THEN DRAWING IS NOT TO SCALE - SCALE ACCORDINGLY

PE PHARMER ENGINEERING L.L.C.

AVIMOR

PROFESSIONAL ENGINEER REGISTERED 8778 STATE OF IDAHO BRADLEY S. BJERKE 11-16-07

DESIGNED:	BSB
DRAWN:	JRH
CHECKED:	RDP
APPROVED:	BSB
PROJECT DATE:	Nov. 2007
PROJECT NO.:	10194
SCALE:	AS NOTED

SunCor Idaho, INC.
Avimor Water Reclamation Facility
Ada County

SITE PLAN

DRAWING NUMBER
C1.0

REV 2

*****.DWG

FILENAME:

Seasonal discharge to avoid critical time periods for water quality

The Avimor WRF will discharge wastewater effluent through three different modes of operation including: agricultural/landscape water reuse, rapid infiltration, and direct discharge to Spring Valley Creek. The water reuse discharge will occur during the growing season and rapid infiltration (RI) will be performed during the non-growing season until the system flows reach the initial permitted capacity of the RI system (0.19 mgd). The water reuse system allows the Avimor WRF to avoid discharges during the times of the year that the Spring Valley Creek is most sensitive to nutrient discharges which can lead to increased nuisance algae growth. By only discharging to Spring Valley Creek during the winter months, degradation of Spring Valley Creek is minimized during the critical time periods. The draft permit received by the Avimor WRF is a seasonal discharge permit only with no discharge allowed April 1st through September 30th.

Winter Storage

Winter storage of wastewater with subsequent reuse during the growing season would be an alternative to discharging to Spring Valley Creek during the non-growing months. The current difference between RI system capacity (0.19mgd) and treatment system capacity (0.33 mgd) yields a 0.14 mgd differential. With the need for 210 days of storage, the winter storage lagoon volume would be 29.4 million gallons for the initial conditions. Following expansion of the wastewater treatment system to the final build-out condition of 1.0 mgd, the differential of 0.81 mgd would require a storage lagoon of 170.1 million gallons. The 29.4 million gallon lagoon will be used as the basis for economic evaluation of this alternative in the following sections, but it is understood a significantly larger storage lagoon would be required to meet full build-out conditions. The ultimate goal of aquifer storage and recovery via the RI system will incorporate these same advantages without the large expenditure of capital. The winter storage alternative requires that wastewater be stored from October through April (210 days).

To give the readers a feel for the size of the lagoons in question, the 29.4 million gallon lagoon will cover 6 acres (500' x 500') with an average depth of 15 feet. The total land requirement for the 29.4 million gallon lagoon will be 10 acres to accommodate the lagoon banks and berms. The 170.1 million gallon lagoon would cover 34.8 acres (1,200' x 1,200') with an average depth of 15 feet. The site requirements for the winter storage lagoon would be flat ground or gently sloping. The lagoon construction requirements would mandate they be HPDE lined which does not present an opportunity for an integrated wetland habitat to be constructed with the winter storage lagoon.

Offsets for water quality

The existing water quality of Spring Valley Creek is very good which is indicative of it receiving the Tier II level of Antidegradation protection. The APC development area has completed numerous stream restoration projects to improve the riparian zones within the development. Large eroded cut banks extending down the eroded stream channel were rehabilitated by filling cut channels with boulders and cobbles and replacing topsoil of the cut banks. Replanting of the riparian zone affected by the grazing and the bank restorations decreases the sediment loads within the creek. The riparian habitat of the Spring Valley Creek within the APC development is now lush with native plants and the effects of cattle grazing have been rehabilitated and fencing will eliminate future stream impacts from cattle within the APC.

Although the water quality in Spring Valley Creek is good, the streambed continues to be affected by cattle grazing and bedding in the upper watershed. The significant cattle activity in the upper watershed stream beds presents opportunities to reduce cattle grazing effects which will in turn offset some of the sediment added through the WRF discharges. The APC has begun the process of fencing the springs in the upper water shed to protect these areas from cattle grazing. Two separate springs were fenced off and replanted to eliminate the effects of cattle grazing and to stabilize the loose soils.

A ½ acre pond was established in the upper watershed near the trailhead of the APC trail system. The pond serves as a settling basin with wetland treatment of the received from the upper watershed. The pond is lined with willows to provide an effective wetland treatment system and to provide for an aesthetically pleasing water feature.

Two bridges have been constructed across the Spring Valley Creek to limit the amount of walking, cycling, and equestrian traffic crossing the creeks. These bridges serve to reduce the sediment load due to the stream bed disruption from the recreational users.

The APC storm water retention ponds combine wetland treatment to reduce sediments delivered to Spring Valley Creek during runoff events. The system was put to the test during the 2006 winter season when a 100-year storm event caused significant erosion within surrounding developments, but the APC retention system successfully captured the storm flows and prevented a large sediment load from reaching Spring Valley Creek.

Table 3 lists the sediment offset projects completed to date and also lists planned offset projects scheduled for the future.

Table 3 Spring Valley Creek Offset Project Summary Table

Project Name	Project Description
Original Creek Restoration within APC Development	Rehabilitate eroded Spring Valley Creek bed and riparian habitat. Replaced eroded stream bed materials with rocks and cobble. Replaced topsoil and plantings on riparian areas.
Natural Spring Rehabilitation	Fenced creek springs to exclude cattle and replanted with native plants.
½ Acre pond and wetland	Creation of a ½ acre pond and wetland at the trail system trailhead for sediment control, riparian habitat, and aesthetics.
Trail bridge construction	Two bridge crossings for Spring Valley Creek trail system to reduce erosion from recreational users.
Storm water retention ponds and wetland treatment system	Construction of the APC storm water retention and treatment system removes storm water sediment runoff from entering Spring Valley Creek. The wetland treatment system allows for sediments and pollutants to be treated naturally prior to discharge.
Fencing of Spring Valley Creek in upper watershed	Continued cattle exclusion and fencing of sensitive areas within the Spring Valley Creek watershed to reduce erosion and sediment transport due to cattle grazing within the riparian zones. (Planned for 2014)

Economic impacts

Total cost effectiveness, incremental cost effectiveness of all technologically feasible alternatives

The following sections will outline the cost effectiveness of all the technologically feasible alternatives for wastewater treatment and disposal. The following sections will show that the APC did not chose the least expensive methodology of wastewater treatment and has coupled a combination of approaches which provides for the least amount of degradation to Spring Valley Creek via direct discharge to surface waters under a seasonal NPDES permit.

The cost of the Avimor WRF has already been incurred, as the treatment facility ($7,000,000), land application system ($500,000), and RI systems ($500,000) have all been designed and constructed. The land application system was brought online June 2013 with average flows of less than 0.1 mgd. The RI system was brought online October 2013 for water discharge through the non-growing season. Total cost for the existing system is $8,000,000.

Rank all tech feasible alternatives by their cost effectiveness at pollutant reduction

This section identifies costs of the technologically feasible treatment alternatives and the resulting pollutant removal totals. All of the disposal alternatives require the treatment of the wastewater via a mechanical treatment system. These costs are included in all of the disposal alternatives described in this section. The mechanical treatment plant discharging to Spring Valley Creek is considered the base case for the alternatives. Utilizing land application, groundwater recharge, or winter storage with land application are all alternatives which require the mechanical treatment plant in advance of disposal. Table 4 lists the costs for each treatment and disposal alternative evaluated for the Avimor WRF along with estimated annual O&M costs for each area. These costs are added together to form the basis of evaluating the different treatment alternatives.

Table 4 Cost of Alternatives

Alternative	Capital Cost	O&M Costs (annual)	Total Cost over 20 years
Relocate Outfall	Not technologically feasible		
Truck to existing treatment facility	Not allowed under IDEQ rules		
Land Application via irrigation	$500,000	$120,000	$2,900,000
Rapid Infiltration System	$500,000	$30,000	$1,100,000
Mechanical Treatment Plant	$7,000,000	$300,000	$13,000,000
Winter Storage Lagoon (29.4 MG) (see appendix for cost development)	$5,300,000	$40,000	$6,100,000

Table 5 shows the cost per pound of pollutant removed from Spring Valley Creek via the different treatment alternatives. The alternatives evaluated monetarily include 1) MBR treatment with year round direct discharge to Spring Valley Creek, 2) MBR treatment with land application during the growing season and discharge to Spring Valley Creek in the winter, 3) MBR treatment with land application during the growing season, discharge to RI beds during non-growing season, and excess water discharged to Spring Valley Creek and 4) MBR treatment with land application during growing season and water storage during the non-growing season.

Table 5 Alternative Ranking Based on Cost Effectiveness at Pollutant Reduction

Alternative	Pollutant	Pounds removed per year	Annual cost per pound removed		
MBR Treatment with stream discharge					
(year round stream	BOD	242,919	$2.68		
	TSS	253,147	$2.57		
	TP	4,986	$130.36		
	Ammonia	25,443	$25.55		
	TN	40,913	$15.89		
				Additional pounds removed over MBR	**Annual cost per additional pound removed**
MBR + Land Application					
During Growing	BOD	249,312	$3.19	6,393	$22.68
Season (1/2 year stream	TSS	254,426	$3.12	1,279	$113.41
(w/ MBR)	TP	5,050	$157.42	64	$2,268.24
	Ammonia	25,507	$31.17	64	$2,268.24
	TN	46,027	$17.27	5,114	$28.35
MBR + Land Application + Rapid Infiltration					
(up to 0.19 mgd for ½	BOD	252,204	$3.37	9,285	$21.54
	TSS	255,004	$3.33	1,857	$107.71
	TP	5,079	$167.35	93	$2,154.13
	Ammonia	25,535	$33.29	93	$2,154.13
	TN	48,340	$17.58	7,428	$26.93
MBR + Land Application + Winter storage					
With subsequent	BOD	255,704	$4.30	12,785	$35.20
Growing season	TSS	255,704	$4.30	2,557	$175.98
Land application	TP	5,114	$215.09	128	$3,519.69
	Ammonia	25,570	$43.02	128	$3,519.69
	TN	51,141	$21.51	10,228	$44.00

Impacts to Receiving Stream

Table 6 shows the resulting in stream concentration for the different pollutants discharged from the Avimor WRF and regulated under the NPDES discharge permit. The in stream concentrations are based on winter time low flows of 30 gpm (0.067 cfs) as identified at the discharge site through wintertime monitoring. Values for pollutant discharge from wastewater are based on the draft NPDES permit limits in Table 6. The actual pollutant concentrations will be significantly less than the permitted limits due to the increased treatment provided by and MBR system.

Table 6 Resulting in stream pollutant concentrations

Pollutant	Background Concentration	Stream Flow (cfs)	Wastewater Concentration	Wastewater Flow (cfs)	Resulting In Stream Concentration	Units	Resulting Flow (cfs)
BOD	10	0.067	30	0.649	28.1	mg/L	0.716
TSS	5	0.067	30	0.649	27.7	mg/L	0.716
TP	0.18	0.067	0.1	0.649	0.1	mg/L	0.716
Ammonia	0.04	0.067	2.4	0.649	2.2	mg/L	0.716
TN	0.3	0.067	10	0.649	9.1	mg/L	0.716
pH	7	0.067	7	0.649	7.0	mg/L	0.716
E. Coli	50	0.067	126	0.649	119	mg/L	0.716
Cl_2	0	0.067	0.009	0.649	0.0	mg/L	0.716

Spring Valley Creek is a tributary to Dry Creek with is a tributary to the Boise River. The Boise River is a part of the Snake River Hells Canyon TMDL which is working towards reducing in stream total phosphorus concentrations to 0.07 mg/L at the confluent with the Snake River near Parma, ID during the growing season. The added input of phosphorus from the Spring Valley Creek discharge will occur during the non-growing season which will not contribute to the nutrient load during the critical phosphorus season.

Select the least degrading option or show that a more degrading alternative is justified

The selected treatment alternative for the Avimor WRF is to provide mechanical wastewater treatment via MBR with land application via onsite irrigation during the growing season. During the non-growing season, treatment wastewater will be discharged to the rapid infiltration basins up to 0.19 mgd, with any excess wastewater being discharged to Spring Valley Creek.

The alternatives analysis shows that the Avmior WRF has incorporated a combinations of alternatives which provides for the least degrading technologically feasible option. The water reuse system eliminates discharge during the critical summer months and the rapid infiltration system reduces the volume discharge to Spring Valley Creek during the winter months. The RI system also eliminates all discharge to Spring Valley Creek during the initial building periods of the Avimor Planned Community.

The wastewater treatment system designed and constructed provides the highest level of wastewater treatment feasible with current technologies and produces effluent with very low concentrations of organics and nutrients. The winter storage alternative which would allow for elimination of all discharge to Spring Valley Creek requires a large storage lagoon which only provides a small increase in pollution reduction. This alternative is not economically justifiable based on the very low concentrations of organics and nutrients discharged to Spring Valley Creek during the non-critical period.

Socioeconomic Justification

Identify affected community

The community affected by the Avimor WRF includes the Avimor Planned Community, Ada County, Boise County, the City of Eagle, and the City of Boise. Each community is affected in different manners and to a differing degree from the APC. The most affected community is the Avimor Planned Community in that they benefit from having a community sewer treatment system which is crucial to building the development. The Cities of Eagle and Boise are affected in that the residents of the APC will likely work and shop within their communities. The residents of Boise and Eagle will also have the ability to utilize the extensive trail system developed by the APC. The impacts to Ada and Boise Counties includes the added tax base from the homes and businesses within the APC.

The initial capacity of the Avimor WRF will serve 1,400 equivalent dwelling units, while the total Spring Valley Creek portion of the Avimor Planned Community will include 7,000 households with approximately 20,000 residents. For the socioeconomic justification portion of this report, only the initial 1,400 EDU (3,800 residents) of the APC will be included as the affected community. The City of Eagle consists of approximately 7,069 households with a population of 19,908 at the 2010 census. The City of Boise population is currently estimated at 213,000 residents. The population of Ada County is currently estimated at 409,000 residents. The population of Boise County is currently estimated at 6,800 residents. (City-data.com)

Affordability

Table 7 is based on a DEQ recommended format for evaluating affordability of the alternatives. The initial phase of the Avimor WRF will be permitted for a flow of 0.42 mgd (420,000 gpd). The estimated flow from each residence is 300 gpd. The current Phase 1 of the Avimor WRF will have the capacity to serve 1,400 equivalent dwelling units (EDU).

Table 7 Economic indicators of affordability

Indicator	Year	Data
Population served	Forecast (Phase 1 treatment system capacity 0.42 mgd)	3,892
Number of households	0.42mgd/300gal/day/res	1,400
Median Household Income, national	2010 US Census Bureau	$51,914
Median Household Income, State	2010 US Census Bureau	$46,423
Median Household Income, County	2010 US Census Bureau	$55,499
% of Total Wastewater flow from Residential & Municipal Sources	Estimated	95%
Unemployment Rate, State	Idaho Department of Labor, Aug 2012	7.4%
Unemployment Rate, County	Idaho Department of Labor, Aug 2012	5.7%
Average Home Valuation	Ada County Assessor	$260,000
Current Market Value of Taxable Property	1,400 x $260,000	$364,000,000
Property Tax Levy Rate	Ada County Assessor	0.012301414%
Property Tax Revenues	Taxable property x levy rate	$4,477,700

Table 8 Average Annualized Cost per Household - MBR Mechanical Plant

Average Annualized Cost per Household for Alternative: MBR Mechanical Plant		
Total Capital	$	7,000,000
Annual Operating costs	$	300,000
Total annual cost of project (20 year operations)	$	650,000
Calculate the Average annualized cost per household		
Total number of households		1,400
Total Annual cost to households/number of households	$	464
Median Household income	$	55,499
Average cost per household / Median household income		0.8%
Monthly Cost per household	$	38.69

Table 9 Average Annualized Cost per Household – MBR + Land Application

Average Annualized Cost per Household for Alternative: MBR + Land Application		
Total Capital	$	7,500,000
Annual Operating costs	$	420,000
Total annual cost of project (20 year operations)	$	795,000
Calculate the Average annualized cost per household		
Total number of households		1,400
Total Annual cost to households/number of households	$	568
Median Household income	$	55,499
Average cost per household / Median household income		1.0%
Monthly Cost per household	$	47.32
Annual cost greater than MBR Treatment alone	$	103.57

Table 10 Average Annualized Cost per Household - MBR+ Rapid Infiltration + Land Application

Average Annualized Cost per Household for Alternative: MBR + Rapid Infiltration and Land Application		
Total Capital	$	8,000,000
Annual Operating costs	$	450,000
Total annual cost of project (20 year operations)	$	850,000
Calculate the Average **annualized cost** per **household**		
Total number of households		1,400
Total Annual cost to households/number of households	$	607
Median Household income	$	55,499
Average cost per household / Median household income		1.1%
Monthly Cost per household	$	50.60
Annual cost greater than MBR Treatment alone	$	142.86

Table 11 Average Annualized Cost per Household - MBR + Winter Storage + Land Application

Average Annualized Cost per Household for Alternative: MBR + Winter Storage **+ Land Application**		
Total Capital	$	12,800,000
Annual Operating costs	$	460,000
Total annual cost of project (20 year operations)	$	1,100,000
Calculate the Average annualized cost per household		
Total number of households		1,400
Total Annual cost to households/number of households	$	786
Median Household income	$	55,499
Average cost per household / Median household income		1.4%
Monthly Cost per household	$	65.48
Annual cost greater than MBR Treatment alone	$	321.43

Identify relevant social, economic and environmental health benefits and costs associated with the proposed degradation in water quality for the preferred alternative.

The important social development from the associated activity is the development of a community for an estimated 3,800 residents. The community incorporates multiple types of housing densities and will incorporate essential facilities including: schools, medical offices, dentists, community store and restaurants. The APC also incorporates over 10,000 acres of open space and over 90 miles of hiking and biking trails to provide for a healthy, active community. The development of a mountain village community for a current population of 3,800 residents and a future population of 20,000 residents also creates significant economic development for the area. Business opportunities are plentiful for the necessary services required for a community of 20,000 residents. The increased tax base to Ada County and Boise County is significant with this number of residents and businesses also.

Economic benefits to the community such as changes in employment, household incomes and tax base

The economic benefits to the community are significant due to the large population served by the Avimor WRF, without the treatment system, the community development would not be feasible on this large scale. Employment opportunities include construction of the APC, operations of the treatment systems, ownership and employment at the local businesses and the added tax base to Ada and Boise Counties.

Tax Base

The tax base associated with the initial 1,400 EDU development amounts to over $4,000,000 in annual tax revenue to Ada County. Table 12 shows the added tax base calculations.

Table 12 APC Home Value Tax Base Addition to Ada County

Parameter	Source	Value
Average Home Valuation	Ada County Assessor	$260,000
Current Market Value of Taxable Property	1,400 x $260,000	$364,000,000
Property Tax Levy Rate	Ada County Assessor	0.012301414%
Property Tax Revenues	Taxable property x levy rate	$4,477,700

Household Income

The addition of the 1,400 household incomes to the community will also benefit the APC and the surrounding communities of Ada County, Boise County, City of Eagle and City of Boise. Table 13 shows the added household incomes added based on Ada County averages.

Table 13 Avimor Planned Community Household Income for Phase 1 Avimor WRF Capacity

Parameter	Source	Value
Median Household Income, Ada County	2010 US Census Bureau	$55,499
Number of Households served by Phase 1 Avimor WRF		1,400 EDU
Added household incomes	Income x # EDU	$77,700,000

Employment Opportunities

The Avimor Planned Community has over 2 million square feet of retail space planned for the community. This retail area will provide business opportunities and employment opportunities within the community. Retail and business opportunities within the community include, retail, restaurant, medical, and outdoor rentals to name a few.

Provision of necessary services to the community

The Avimor Planned Community requires wastewater treatment to allow a community of this size to be built. Individual septic systems can only serve small rural areas with large lots and can potentially increase nitrate concentrations in groundwater. The centralized wastewater treatment and water reuse not only provides wastewater treatment to the community, but also provides a source of irrigation water for the common areas, parks, and walking paths. Without the water reuse system, the community would be required to consume higher amounts of surface water or pump groundwater for irrigation needs.

Potential health impacts related to the proposed activity

Although the discharge of treated wastewater to Spring Valley Creek increases the pollutant load to the creek, the in-stream concentrations of pollutants does not constitute a health risk to humans, animals nor plants exposed to the waters of Spring Valley Creek.

Impacts to direct and indirect uses associated with high quality water (fishing, recreation and tourism)

Spring Valley Creek has minimal recreational opportunities during the winter months for fishing, or contact recreation. Spring Valley Creek has the highest amount of recreational use during the summer months when the Avimor WRF will not be discharging to the creek. The changes in in-stream concentrations of organics and nutrients will not impact existing direct or indirect uses of Spring Valley Creek.

Retention of assimilative capacity for future activities or discharges.

The assimilative capacity of Spring Valley Creek is difference between the water quality standards and the in-stream concentration of said pollutants following discharge. Table 14 shows the assimilative capacity of Spring Valley Creek.

Assimilative Capacity = water quality standards (mg/L) – pollutant concentration following discharge (mg/L)

Table 14 Assimilative capacity of Spring Valley Creek

Pollutant	Receiving Water Concentration After Mixing (mg/L)	Standard (mg/L)	Source	Remaining Assimilative Capacity (mg/L)	Used Assimilative Capacity (%)
BOD	28.1	30	Technology based limit for Secondary Treatment Standards 40 CFR 133	NA	NA
TSS	27.7	30	Technology based limit for Secondary Treatment Standards 40 CFR 133	NA	NA
TP	0.1	0.07	Snake River Hells Canyon TMDL (Boise River WLA)	0	100%
Ammonia	2.2	2.4	IDAPA 58.0102.250	0.2	92%
pH	7.0	6.0-9.0 s.u.	IDAPA 58.0102.250	NA	NA
E. Coli	119	126 CFU	IDAPA 58.0102.251	7	94%
Chlorine	0.009	0.019 acute 0.011 chronic	IDAPA 58.0102.250	0.002	82%

Appendix 1

Lagoon Cost Worksheet

AvimorWRF | December 1, 2013

Preliminary Cost Estimate

210 Day Storage Lagoon | **29.4 MG** | **Revision 1**

PHARMER ENGINEERING

Description	QTY	Unit	U. cost	Install	Cost	Remarks	
Earthwork							
Stripping & Excavation	75,000	CY	$4	0%	$300,000		
Fill for Wall Construction	5,000	CY	$7	0%	$35,000		
Import Fill	0	CY	$15	0%	$0		
Rip Rap	2,500	CY	$38	0%	$95,000		
Anchor Trench	700	CY	$9	0%	$6,300		
Fine granular structural interior fill base	500	CY	$13	0%	$6,500		
						Earthwork Subtotal =	**$442,800**
Concrete Work							
	0	CY	$450	0%	$0		
						Concrete Subtotal =	**$0**
Yard & Interior Piping							
Yard piping	1	LS	$80,000	0%	$80,000		
						Yard and Interior Piping Subtotal =	**$80,000**
Liner							
Primary Liner (80 mils)	343,689	SF	$2.70	0%	$927,960		
Liner Hold Down Weights	1	LS	50,000	0%	$50,000		
Secondary Liner (60 mils)	0	SF	$1.75	0%	$0		
Monitoring Wells	4	ea	$10,000	0%	$40,000		
						Liner Subtotal=	**$1,017,960**
Mechanical Building							
Mechanical Building	600	SF	$175	0%	$105,000	Includes HVAC, plumbing, and lighting	
Valves and Misc mech equip	1	LS	$35,000	20%	$42,000		
Effluent Pumps	2	LS	$25,000	35%	$67,500	Gorman Rupp	
						Mechanical bldg Subtotal=	**$214,500**

TOTALS

			SUBTOTAL =		**$1,755,260**
			Permits =		$25,000
			Mechanical =	10%	$175,526
			Electrical =	2%	$35,105
			Engineering =	10%	$175,526
			Allowance =	15%	$263,289
			Contingency =	20%	$351,052
			Contractor O&P =	5%	$78,987
Land Cost	10	acres	$240,000/acre		$2,400,000
				TOTAL =	**$5,259,745**